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VOL. LXXIII 19 NOVEMBER 1955 No. 1897

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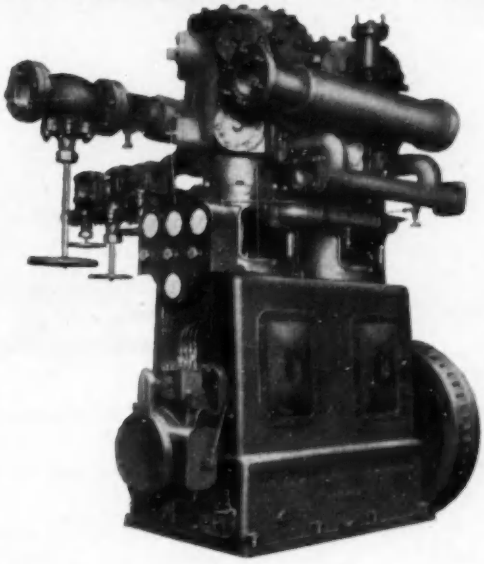

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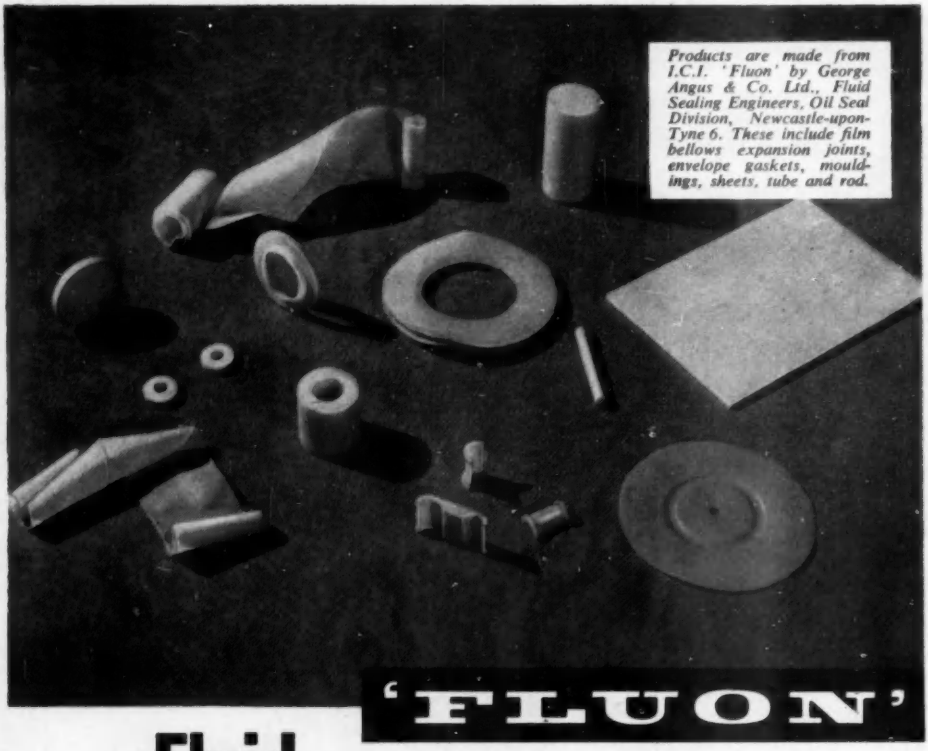

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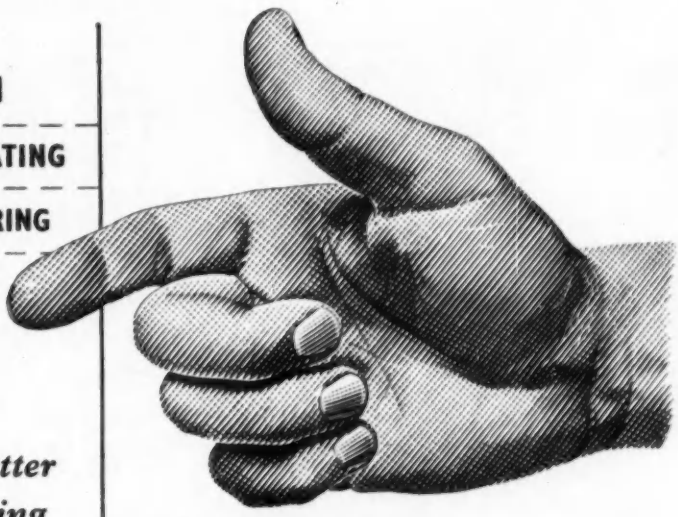

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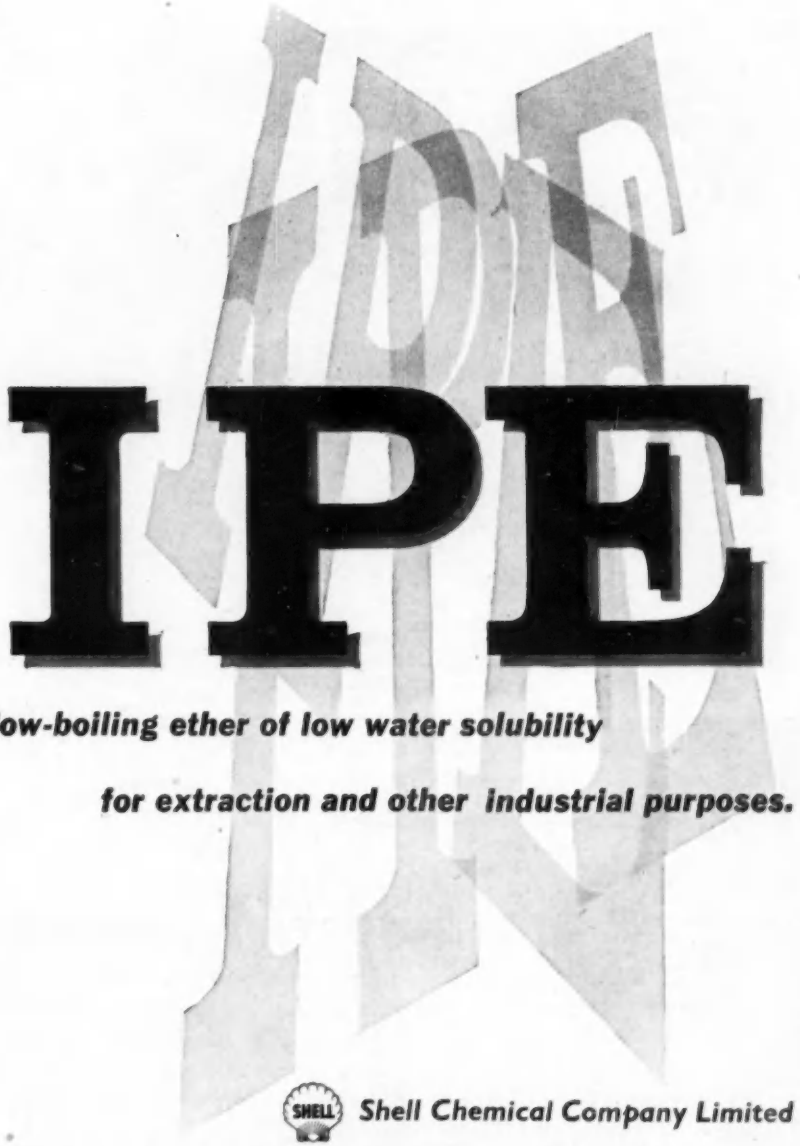

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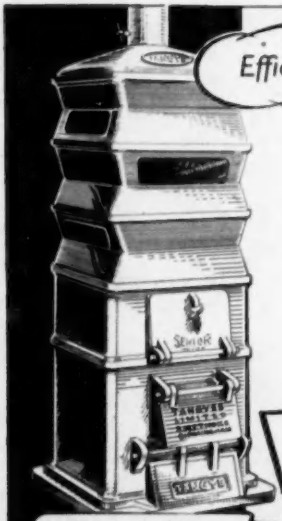

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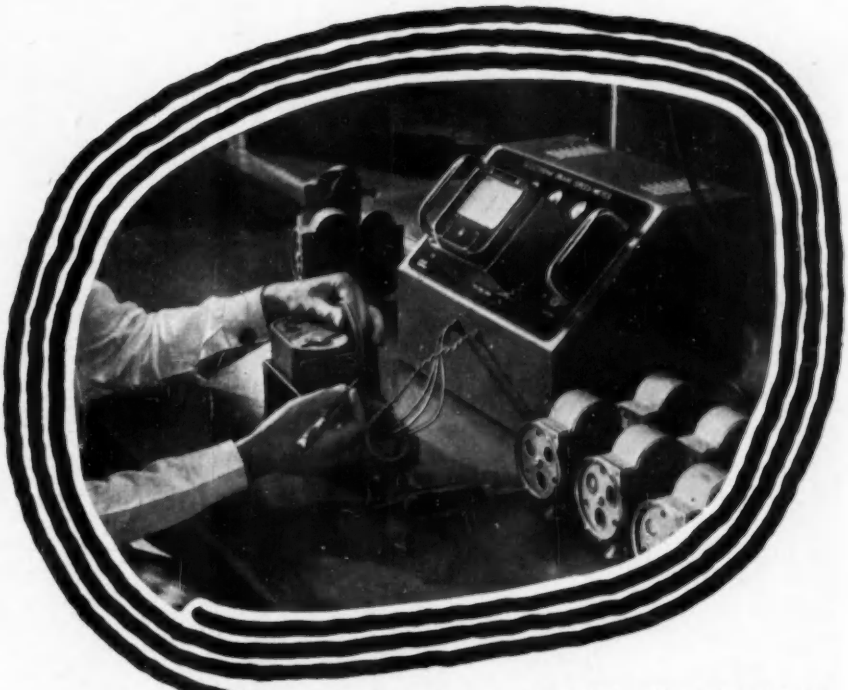

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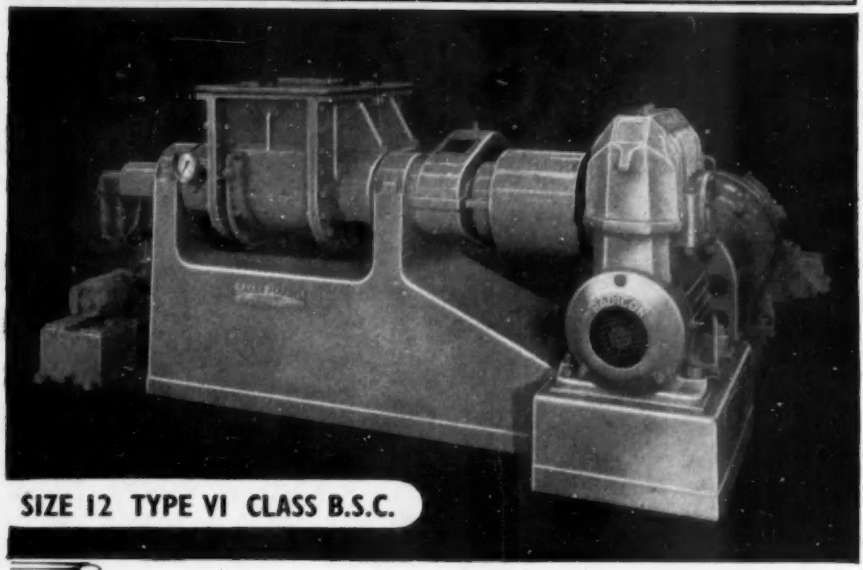

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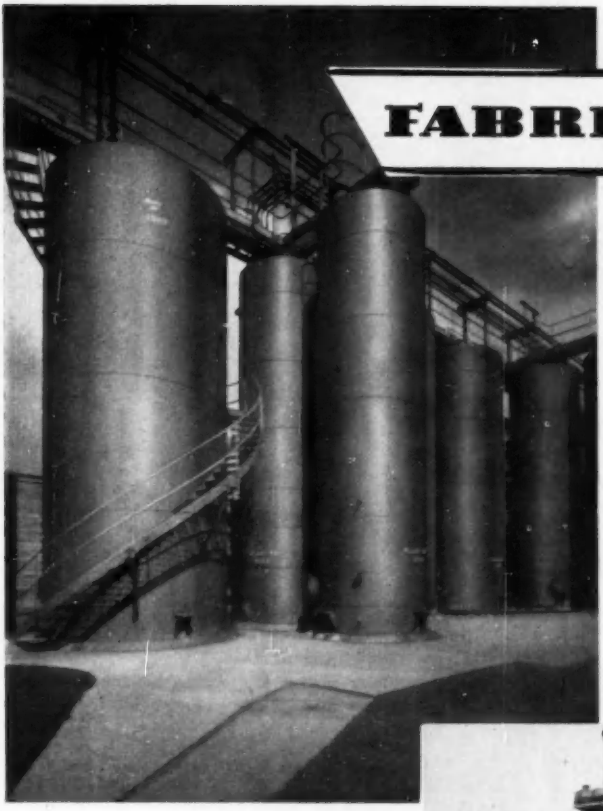

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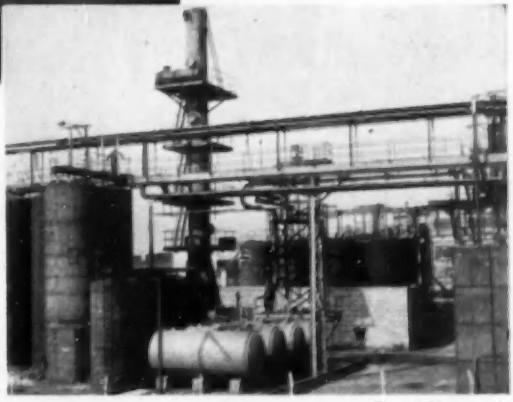

'Times' Photograph

- (above) Part of a battery of twelve mild steel storage tanks—the largest (of which there are four) being 12 ft. in diameter and 30 ft. high.
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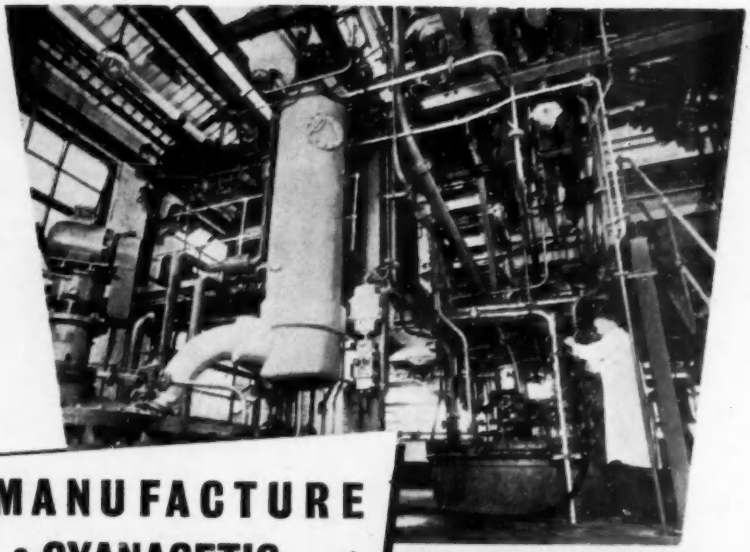

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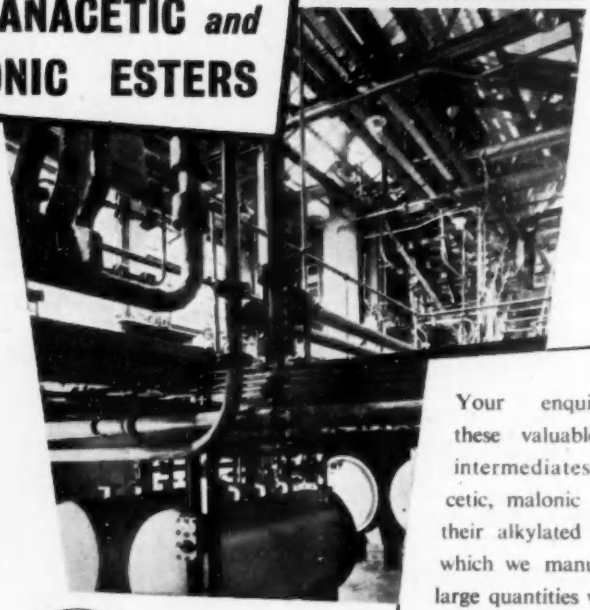

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German Picture

THE Intelligence Division of the DSIR has published a most valuable book—'A Brief Review of Science and Technology in Western Germany' (HMSO, 104 pp., 4s. 0d.). In their joint task of observation and compilation, Mr. K. H. Lauder, our Scientific Attaché at Bonn and his staff, have functioned admirably. The book is largely factual; critical analysis or comment must obviously be beyond the book's purpose and scope. But here is a picture of German recovery far more complete and three-dimensional than any snapshot impressions formed during time-limited and localised visits to Western Germany. It scarcely need be said that this is a picture to be studied here from several different angles. The penultimate sentence of the text, the key-point in the final summing-up, must be quoted: 'Western Germany has reached a stage where, starting from widespread destruction and chaos, it has, in a brief space of 10 years, regained a position amongst the world's leaders in the scientific and technological field.' Personal reactions to this fact will vary. So, too, will predictions about the future turn of events.

The immediate post-Hitler plight of Western Germany was incredibly bleak so far as science was concerned. It has probably been under-estimated by most of us here; for however shattered a country may be at the end of a war, it is a fairly ready assumption that a good part of the scientific machine, both the means and people of science, remains relatively intact. This assumption is inapplicable to Germany in 1945. Research establishments had suffered 61 per cent total destruction. Not only war but political and racial ideologies had scattered scientists; the operative remnant of German science was at a standstill. Rehabilitation began in 1946 when the British occupying authorities made it possible for a selected number of scientists to have a centre with laboratory facilities at Göttingen. This was not only the nucleus of recovery; it has also grown into the new Max Planck Society for the Advancement of the Sciences, a non-industrial organisation today administering 40 research establishments, and corresponding in functions with the pre-war Kaiser Wilhelm Society.

There are many significant facts to be digested. Almost all the war-damaged research centres have been entirely rebuilt; in addition, many new ones have been founded. On this point, here is one of the few comments made in the book: 'On the average, the buildings and equipment give the impression that they are better than those of establishments in the United Kingdom doing comparable work.' Is it too jocular to recall the old business joke, 'nothing succeeds better than a good fire'? It is not entirely irrelevant. During the first seven or eight years of our own post-war rehabilitation, British research facilities, even where they had suffered damage, had to adopt a make-do and make-shift policy. The first hopes of rapid reconstruction

(and of attention to long-neglected expansion) were shattered by the first sterling dollar crisis. Government support for research in Western Germany has grown steadily, exceeding DM.600,000,000 in the last financial year. 'When it is considered that none of this money has been employed in defence research it is a considerable sum.'

Finding the staff for research seems to have been a greater problem than providing money or facilities. Scientists who had left Germany during the Hitler régimé were persuaded to return; promising young men were given maximum opportunity. Until 1948 brought currency reform, financial support from the German Government was limited; this change in support must have coincided somewhat fortuitously with an improvement in scientific man-power supply. Here again Germany did not have to face a defence drain upon a severely limited resource. Also, research in aerodynamics, radar, and nuclear science was forbidden or greatly restricted; if this has created a huge gap in Germany's 1955 research front, it also enabled her to concentrate staff upon other fields.

It is estimated that industry in Western Germany spends about the same annual sum as the Government upon research—DM.600,000,000. A 5 per cent slice of turnover is quoted for the chemical industry, but the validity of this figure appears to depend only upon the published accounts of large concerns. Possibly, as here, the larger companies' ability to back research heavily is not a strictly correct sample. But fundamental research is strikingly supported by industry; it has a sizeable place in industry's own research centres and the association between industry and academic research is also very close. Is this an indication of a broader and longer-term outlook than those that prevail here and in the US?

It is suggested that the organisation of science has been improved. Total collapse produced an opportunity for methods of organisation in the UK, US, and France to be studied, and there has been some selective absorption of ideas. A notable development has been the German Research Council's readiness to give grants or subsidies to promote the publication of scientific books and journals. This support is given to publications unlikely to enjoy a wide market. Assistance to students for having their theses printed is included in this general scheme. In the scientific journal field, some 100 journals have received aid and 62 were enjoying printing subsidies in 1954. *Stifterverband*, the shortened name of a society of VIPs, mainly industrialists, collects money from industry for the support of science. Industry has its research associations but, although otherwise similar to our own, they do not conduct research at establishments of their own; they co-ordinate research and act to some extent as research information agencies, and they sponsor research projects at institutes, universities, etc. It seems worth more than a brief and passing thought that in Germany it is considered that an industry's research association can be of great value without having its own research establishment.

It is made clear, not through the text compiled by British observers, but by Sir Ben Lockspeiser's foreword and a published letter to him from Dr. Otto Hahn, President of the Max Planck Society, that much of the initiative and essentially needed help in the first stages of this remarkable recovery came from the British occupation authorities. For example, British recognition of the revived Kaiser Wilhelm Society under its changed Max Planck name preceded American recognition by a year and French recognition by even longer. Now the recognition of this action and many other similar actions is sincerely expressed by Dr. Hahn. We must hope that this is not forgotten; yet it has much the same effect if it is not even widely known in Western Germany. What has been done to turn collapse into a new and modern stability must be admired; only an essentially great nation could have achieved so much in 10 years of continued partition and occupation. Will the external help that fortified the internal will be remembered when further progress brings even greater national pride? One defence against this undesirable tendency—and history reminds us of this tendency—is frequent and wide-ranging contact between German and British scientists. In friendship and understanding the meaner kinds of illusions rarely establish their roots.

Notes & Comments

An £11,000,000 Project

AMMONIA and nitric acid from refinery gases—a long-term agreement between Shell Chemicals and Fisons—and two new fertiliser works in the Thames Estuary, together costing about £11,000,000; all this amounts to a major piece of chemical news (see page 1046 of last week's issue). It seems that one factory will be Shell's concern and produce the nitrogen, and the other will be built by Fisons to use this supply in making ammonia-based fertilisers. It has been stated that the first plant will produce 75,000 tons of ammonia, of which the second plant will use 60,000 tons. This indicates that there will be a production of some 600,000 to 700,000 tons of compound fertilisers at the latter. If all the remaining ammonia were to be used for making ammonium nitrate/limestone fertiliser (the same type of product that ICI has popularised as 'Nitro-Chalk'), an output of about 82,500 tons is expectable. However, some of the ammonia produced will be taken for non-fertiliser markets. There seems to be no intention to develop nitrophosphate processes using nitric acid to dissolve and activate mineral phosphate.

Over-Production Unlikely

THERE is, of course, nothing new in this type of agreement between a fertiliser company and another chemical company possessing a by-product of fertiliser value. Similar agreements have been made in the past for utilising sulphuric acid produced as a by-product of metal smelting. Given a long-term agreement ensuring supply, the erection of a fertiliser works close to the point of supply becomes a feasible proposition. There is more novelty in the fact that Fisons will be entering the nitrogen raw material field on a substantial scale. This ever-growing concern has emerged stage by stage out of the superphosphate-making businesses of the nineteenth century, and it is broadly true to say that their main interest has always been that of phosphate production, with most of the nitrogen and potash also used in compound fertilisers obtained externally rather than pre-processed. In contrast, ICI's fertiliser section has had its main interest in nitrogen production. However, this new development is unlikely to lead to any over-supply of fertiliser nitrogen. Much more could be profitably used on almost every farm in the country, and at times the export demand for nitrogen produced here is in conflict with the home demand.

Antibiotics & Food

IN late October the first International Conference on antibiotics in agriculture was held at Washington. Scientists from 13 countries visited America to take part in it. Although so much still remains to be discovered about the effects of antibiotics on farm animals, crops, crop diseases, and food preservation, it is at least clear that these uses of antibiotics are being widely exploited and studied, that even the more slowly developing of them is much more than a passing craze or nine days' wonder. No one yet knows exactly why or how antibiotics stimulate animal growth. If the biological mechanism of these effects could be elucidated, research could be much less empirical in character. Even so, the facts of success cannot be discredited. The more effective antibiotics for this purpose are known; the optimum rates of dosage are reasonably known; the relationship between farm sanitation and quality of ordinary feed rations and expectable antibiotic benefits is also known. Antibiotic additives to animal food pay—if there were inconsistencies of performance in the past, these can now be attributed to the use of less effective antibiotics or to the background conditions of sanitation and feeding.

Prolongs 'Freshness Life'

NEWER and less developed uses are more interesting now. There are two new techniques for using antibiotics to slow down the rate at which fresh meat deteriorates—feeding animals

at a highish dosage rate with antibiotics just before slaughter, or injecting antibiotics into carcasses immediately after slaughter. The effects of internal spoilage seem significantly reduced. As a result the time-period for distribution of a perishable foodstuff is lengthened. Where refrigeration is also employed, great advances in reducing wastage are expectable. In countries where refrigeration is little used, fresh meat distribution possibilities may be much extended. In the fishing industry the use of quite small amounts of antibiotics—principally aureomycin on the basis of present Canadian research—added to the ice or chilled seawater used on boats can double the 'freshness life' of a catch of fish. This fairly inexpensive method has been successful even with shell-fish, though not to so striking an extent as with normal fish. If antibiotic additions could solve this problem, now so acute with major fishing grounds ever more distant from consuming countries, it may become the most important of all non-medical antibiotic uses.

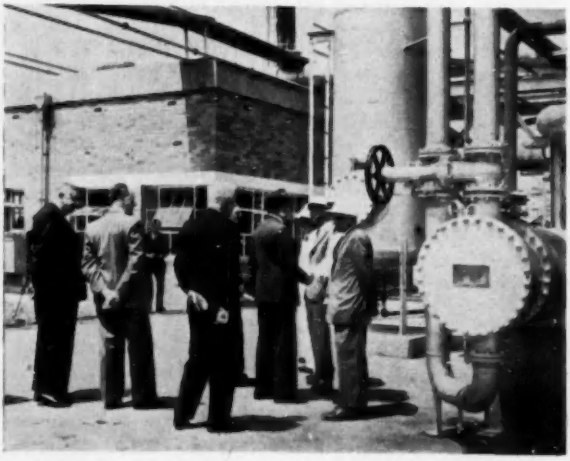
Molybdenum Deficiencies

STRAP-LEAF of hibiscus, a malformation of the leaves and blossoms of this plant when grown on the acid soils of Florida, has been shown to be caused by a deficiency of molybdenum in the soil, two scientists reported on 1 November at the 68th annual meeting of the Florida State Horticultural Society.

Dr. P. J. Westgate, of the Central Florida Experiment Station, Sanford, Fla., and Dr. H. N. Miller, of the Agricultural Experiment Station, Gainesville, Fla., stated that the plant disease can be corrected by adding five grams (about one teaspoon) of molybdic acid or sodium molybdate in one gallon of water applied as a foliar spray or soil drench. Duration of the effect of the molybdenum is increased by adding lime to the soil along with the molybdenum, their experiments showed.

Molybdenum is a trace element which only recently has proved to be essential to growth of plants (see THE CHEMICAL AGE, 1955, **73**, 993). Since this discovery, application of only a few ounces of molybdenum an acre to a variety of crops has resulted in remarkable increases in yield and quality. A number of plant diseases which have long been recognised but the causes of which were unknown, moreover, have been traced to molybdenum-starved soils. Two of these are 'whiptail' of cauliflower and 'yellow spot' of citrus, both of which are now controlled by treatment with molybdenum chemicals.

Molybdenum-deficient soils are not confined to Florida; locations in some 20 states have now been pinpointed.



The new 3,000,000 tons a year Kwinana oil refinery of British Petroleum Company, near Fremantle, Western Australia, was officially opened on 25 October by Field Marshal Sir William Slim, Governor-General of Australia. In the photograph Sir William is shown greeting refinery workers. Also shown in the photograph are D. W. Brisbane, chairman of APRL; A. E. Mason, managing director of APRL; Lord Strathalmond, chairman of BP, and D.W.K. Barker, refinery manager, APRL

Need for Exports Stressed

Minister Addresses BCPMA Annual Dinner

A RECORD attendance of 470 members and their guests was experienced at the annual dinner of The British Chemical Plant Manufacturers' Association held on Thursday, 10 November, at Grosvenor House, London. Next year an even larger number is expected and plans are already being made to book a larger dining room. At the 1953 dinner the attendance was 250 and last year it was 350.

After greeting the many official guests—chief among whom was Mr. Derek Walker-Smith, Parliamentary Secretary to the Board of Trade—as well as those of members, the chairman, Mr. W. J. Hooton said:—

'I have now been chairman of the Association for 18 months and have served on its executive committee since 1941. . . .

'Looking back I am staggered at the growth of our industry. There are many members of the Association here this evening who did not know BCPMA as I first knew it let alone as it was when my father was serving on the executive committee in the thirties. In 1935 the Association's annual report stated that there were then few important firms substantially interested in chemical plant who were not in the Association—yet the membership was only 45. To-day with no dilution of our technical strength we have 220 members—a clear indication of the growth of the chemical plant industry over the last 20 years.

Friendliness & Goodwill

'In those early days firm foundations were laid and standards were set of friendliness and goodwill which I am glad to say are still characteristic of BCPMA in spite of its growth. During and immediately after the war, the Board of Trade was our sponsoring Ministry so we have really returned to our old love. It was during that period of changing back to peace production that BCPMA began really to grow; a spirit of mutual respect and co-operation was built up with the Board of Trade which I like to feel has remained to this day. Active work was initiated in the field of chemical engineering education—to which I was very glad to hear our director so properly draw attention at the recent OEEC Conference on the Functions and Education of the Chemical Engineer in Europe—and while mindful of its responsibilities at home, the industry began to take a really serious interest in overseas markets. Great tribute is due to the officers of that time and particularly to the then director, the late Norman Neville. In many ways they set the pattern of our present activities.

Chemical Engineering Research

'What of our future? This leads me to speak of chemical engineering research and here for reasons which will be obvious I must repeat much of what Mr. Worboys said at the recent annual dinner of the ABCM.

'The Cremer Report emphasised the varied and insistent needs for research in chemical engineering and ever since its publication some four years ago BCPMA jointly with the Association of British Chemical Manufacturers has been considering the action which the two industries should take.

'We were both agreed that although it would have been comparatively easy to decide to set up a research association of the normal DSIR type this would not necessarily meet the requirements of our industry. It was felt that we needed:—

(1) the adequate dissemination and the full use of existing chemical engineering information;

(2) the proper appreciation throughout the industry of the economic advantages of applying chemical engineering knowledge; and, of course,

(3) proper, adequate and appropriate facilities for both fundamental and applied research.

'I share Mr. Worboys' view when he emphasised that it would be wrong to assume that the overall competitive strength, or the rate of growth, of the British chemical industry is at the moment being badly affected by the lack of chemical engineering knowledge. The same is true of the chemical plant industry although the position must obviously vary from firm to firm. A great deal of research has been done by the British chemical plant industry.

'You have heard or read of the action which the ABCM is to take, now you will

want to know what BCPMA proposes, and I will tell you what your Council decided this afternoon. In the first place we shall maintain close liaison with the chemical manufacturers by representation on the ABCM Research Committee. Secondly, our own Research Committee is to be enlarged and it is hoped that the liaison with the chemical industry will be further strengthened by the ABCM having a representative on our committee. Thirdly, the Association is to set up an Information Exchange Service.

Research Committee's Duties

'The Research Committee is to be charged, among other duties, with maintaining close touch with the chemical engineering research being conducted in the universities, research associations, research stations and independent research establishments, with a view to keeping members informed of what is being done and, at the same time, suggesting other lines of research.

'The Information Exchange Scheme is designed to promote the exchange of non-confidential information applicable to the chemical plant industry. It is hoped through this scheme to stimulate a valuable flow of information between members and at the same time reveal opportunities for the conduct of research. . .

'What is in store for our industry? It has been said that there is no finality in chemical industry—how true this is for its face is changing all the time—new products are being discovered, new techniques are being developed. In addition, for so much of it involves chemical engineering of a very high order, there are the wonderful achievements in the field of atomic energy. Never has there been such a challenge to the chemical plant industry and as far as one can see it will not grow less. For the future, then, we have a great responsibility—to ourselves and to our customers—I am confident that we shall not be found wanting.'

Mr. Derek Walker-Smith, in his response, said that it was a real pleasure to be the guest of the Association so shortly after his appointment. Recalling the chairman's reference to the fact that we were living in a time of challenge, he said it was indeed a time of two-fold challenge. There was the general and enduring challenge of this atomic age, with all its problems, its perils and its hopes. But we were also living in a time of immediate and pressing challenge in our economic position and the chemical industry was closely and vitally concerned in both those great challenges which faced us as a nation.

In connection with the challenge of the atomic age the industry had done great service in helping forward the great task of the 20th century in harnessing atomic energy for the beneficient uses of mankind; and special recognition was due to the co-operation which existed between designers, engineers and technicians of the industry and those of the Atomic Energy Authority, which had not only helped them in the past, but had enabled them to embark on their large programme of reactor construction in the comforting knowledge that the chemical plant industry would be able to meet the demands made upon it.

On the economic challenge, he said we all knew the background of our economic position to-day, we knew how the intensity of home demand for consumption and investment had had the simultaneous effects of increasing our import requirements and of reducing the resources which we could devote to our export industries. A comparison of the figures for the two middle quarters of this year, ending June and September, with those for last year, showed that imports had risen by 11 per cent and exports had risen by only 3½ per cent. It was obvious that such a tendency had an adverse effect on our balance of payments and on our gold and dollar reserves.

Resources for Investment

On the problems of personal consumption the situation was fairly clear. But the relationship of resources for investment as against resources for export industry was a question at once more subtle and more delicate. We needed investment to increase the efficiency and the competitive power of our export industries. But we also needed more exports, and we needed them now. Inasmuch as the same resources could not simultaneously be devoted to both, we had to that extent a conflict. The relationship between investment and export was one of balance, which might have to be adjusted according to the change of time and circumstances.

The fixed investment of 1954 totalled £2,452,000,000, amounting to about one-seventh of our gross fixed capital investment. Engineering goods of themselves

made up about half of that gross fixed capital investment; and within that half, plant and equipment accounted for one-third of the total, i.e., £853,000,000. But the engineering goods which accounted for so large a part of our investment also accounted for no less than two-fifths of the total export industry of the country, and represented the sector from which we hoped for the greatest contribution in the future.

How did the chemical plant industry fit into that general picture, how did it fit into that general stretching and into the general relationship between investment and export? The industry was a direct exporting industry; but it had also other vital contributions to make which were less directly in the export field, because it served the main chemical products industry, and that industry had direct exports which were not only large, but were, happily, increasing at a very rapid rate.

Increased Exports

He understood that the annual rate in 1955 for exports by the chemical industry was running at £220,000,000, which was not only a large and very significant figure in itself, but represented a very substantial increase over the figure for (say) 1951, when it was £143,000,000; and the Government looked confidently to the chemical industry for a continually growing contribution to our export trade. And, of course, the chemical industry also provided chemicals to every other industry, thereby making a further, though less direct, contribution to our country's exports.

What the chemical plant industry did for the chemical industry was in the realm of investment, but at the same time it helped to promote our export trade. In addition, it made its own direct contribution to exports. It was on a somewhat different scale, naturally, from that of the chemical industry as a whole, and it had not quite the same emphatic upward curve. Nevertheless, he understood that the exports of the chemical and gas plant industries—they were grouped together statistically—were running at the rate of £2,600,000 this year, an increase of about £500,000 over the figure for 1951, and it was a significant, useful and welcome activity.

If the chemical plant industry, like other important goods industries, should find that the reduction in the pressure of the home economy as a whole reduced the pressure on itself, it had the opportunity to expand its exports, thereby serving its own interests and the interests of the country at the same time. Indeed, there were areas of great opportunity for the chemical plant industry in the overseas markets.

Sicily Won't Import Fertilisers

WHEN two new fertiliser factories are completed at Catania and Augusta, Sicily will be independent of imports. On an average the island uses about 220,000 tons of fertilisers a year, of which the bulk has had to be imported from the Italian mainland or from abroad.

The exploitation of raw materials in Sicily for the production of fertilisers was begun by the Montecatini Co. at Porto Empedocle where they recently established a factory for producing superphosphates and nitrogen fertilisers. The factory, which cost 2,700,000 lire, has an annual capacity of 50,000 tons.

With the two factories which are to be built at Catania and Augusta the total output of fertilisers in Sicily will rise to 290,000 tons a year.

As well as making Sicily self-sufficient in fertilisers, the factories will also present an outlet for Sicilian sulphur which is hard to market these days. Recently, Mr. Mattarella, the Italian Minister of Foreign Trade announced that substantial potassium-containing beds have been discovered in the island which will soon be utilised for the production of fertilisers.

Paint Exports Increase

SPEAKING at the Paint Industry Export Group's annual meeting in London on 10 November, Mr. H. J. Godwin Wolf, the chairman, said that exports for the year ended last September totalled £11,690,000, compared with £10,740,000 in the previous year. By volume the increase represented a 10 per cent gain and was regarded as very satisfactory as it was obtained in a period which included two dock strikes.

Commenting on unbalanced trade with OEEC countries, Mr. Wolf said the paint industry was ready to reduce the unbalance by exporting more, if their governments would remove import restrictions. Import controls, he said, were still the major obstacle to a more rapid export paint trade.

ICI Titanium Factory

New Project at Swansea Site

A FACTORY for the fabrication of the 'new' metal, titanium, is to be built by ICI near its existing works at Waunarlwydd (Swansea). Work will begin as soon as possible and it is hoped that the new factory, which will cost about £2,000,000 and employ some 250 people, will be in production in 1958.

Considerable research and development work by ICI has culminated this year in the commissioning of two large-scale plants for the production of titanium and its alloys. The first of these, built by the company's General Chemicals Division at Wilton in Yorkshire, is concerned with the extraction of metallic titanium and can produce 1,500 tons of raw titanium a year. The second, at the Kynoch Works of the Metals Division in Birmingham, is responsible for melting granular titanium produced at Wilton and forging it into slabs and bars for further fabrication.

Some fabrication into wrought forms—sheet, strip, plate, rod, tube and wire—is at present being carried out at Kynoch Works and in other Metals Division factories, including Landore and Waunarlwydd Works in South Wales. The demand for fabricated products (particularly sheet, rod and tube for the aircraft industry) is, however, developing so rapidly that the company has decided to build a new factory where fabrication processes can be more extensively developed.

ICI says it is glad of this opportunity of bringing an entirely new industry to South Wales and thereby maintaining its already considerable interests in the Swansea area. The company has, at Waunarlwydd, land which not only meets immediate requirements but allows, if necessary, for expansion. The new industry is, of course, similar in some ways to that already well established at Waunarlwydd Works—the fabrication of aluminium and its alloys.

Atoms Exhibition at BIF

THE 'Atoms for Britain' exhibition, which created world-wide interest when originally staged at Geneva during the recent atomic energy conference, will be seen for the first time in this country at next year's British Industries Fair. It is to be presented by the UK Atomic Energy Authority and will be a major feature in the BIF electrical and electronics sections at Olympia, London, from 23 April to 4 May.

The exhibition, which covers 7,000 sq. ft., will show Britain's progress in harnessing nuclear power and in using atomic energy in industry, agriculture and medicine. An official of the UKAEA said, 'This will be the first occasion that atomic energy has been illustrated on such a scale and in such a comprehensive way in Britain'.

The research carried out at Harwell will be illustrated by large-scale models, photographs and diagrams. One of the models will be of DIDO, the 'heavy-water' research reactor which will be completed by next summer.

A model of Britain's first atomic station now being built at Calder Hall, Cumberland, will also be on show. This station, which is scheduled to start feeding electricity into the national grid at the end of next year, is the first of 12 to be built in Britain during the next 10 years. Another model on display will be of a more advanced and experimental type of power unit now under construction at Dounreay, Caithness.

Systemic Insecticides

RAPID advances in the chemical industry will benefit both the Canadian farmer and home gardener, says an official of a Toronto chemical firm.

Mr. A. T. Sinclair, of the North American Cyanamid Co., told the Vancouver section of the Chemical Institute of Canada that the chemical industry through research 'is going to play probably the biggest rôle in increasing farm production in years to come.'

Millions of dollars, he said, are being spent on research by major companies, and some new developments are expected soon.

Mr. Sinclair, a former crop specialist with the Alberta Government, said new systemic insecticides will offer plants greater protection than ever before and save spraying costs.

Most systemics now in use are toxic to man, he said, and added that research now is under way to make them safe. At present, seeds are treated with a systemic fluid which spreads through the plant as it grows.

Mr. Sinclair said new fungicides also will be coming on the market soon to aid in the control of fruit diseases.

Compound Fertiliser Formulation

Speaker Discusses Earlier Important Paper

AT a meeting of the Fertiliser Society held on 10 November Dr. R. Stewart read a paper entitled 'Compound Fertiliser Formulation'.

In his introduction Dr. Stewart spoke of the Jubilee Memorial Lecture, 'The Production and Use of Fertilisers: Some Current Trends and Problems', given by the late Dr. E. M. Crowther to the Society of Chemical Industry in London on 8 February, 1954. Dr. Stewart said that he could not speak with the same authority as Dr. Crowther but he would attempt to give some comments on what appeared to him to be the significant sections in his paper. 'I hope that what I have to say will help to stimulate some discussion on Crowther's paper at this meeting'.

Dr. Stewart began by giving some figures on the present position as regards the consumption of mixed or compound fertilisers in this country and the US and then went on to discuss the need for some standard system of formulation. Dr. Crowther, he said, had proposed that mixture ratios should be expressed not in terms of N, P_2O_5 and K_2O, but in terms of the elements N, P and K. The type of fertiliser should be defined by the three letters N, P and K followed by three figures giving the ratios, with P always 1 and N and K either zero or one of the whole numbers 1, 2, 3 and 4. The use of this system was illustrated by Dr. Stewart for the six fertilisers recently under discussion as approved mixtures for England and Wales.

Author Doubtful

In his own view, said Dr. Stewart, he was beginning to doubt the logic of changing to the 'N', 'P' and 'K' system. Neither this nor the older system was correct from the point of view of plant physiology. Plants did not absorb elements in elemental form but in ionic form, and in the case of nitrogen—and possibly phosphorus—in more than one form.

It was frequently stated, said Dr. Stewart, that the present system caused confusion to students. In his view, any change would cause even greater confusion with farmers (and possibly among manufacturers).

Optimal rates of fertiliser application were also discussed by Dr. Stewart. The average response of different arable crops to a standard level of fertiliser application was calculated by Yates and Crowther in a paper entitled 'Fertiliser Policy in War-Time' (*Emp. Jour. Exp. Afric.*, IX, 1941) using an expression of the law of diminishing returns. These authors were able to determine simple formulae relating optimal dressings of straight fertilisers with fertiliser prices and crop values.

Interactions Ignorable

These formulae related only to separate fertiliser elements and not to mixtures of two or three such elements. The separate effects of N, P_2O_5 and K_2O could not be added together to give total effect of a mixture unless it was assumed that interaction between fertiliser elements was non-existent or negligible. Generally speaking said Dr. Stewart these interactions were usually relatively small and no serious error would be introduced if they were ignored.

The possibilities of a small range of compounds providing for most requirements were discussed by Dr. Stewart. In view of the lack of precision in our knowledge of soil and crop requirements it was unnecessary to manufacture a large range of compounds. Three provisional N P K ratios had been agreed on by the Ministry of Agriculture and the Fertiliser Manufacturers' Association; they were:—

(1) 1 : 1 : 1½
(2) 1½ : 1 : 1
(3) 1 : 1½ : 1

The speaker concluded by saying that fitting the mixture to the crop and soil was no easy task, but from the results of field tests it was possible to calculate the best possible N P K ratios. The fertilisers most widely used in this country were based on the data provided by Crowther and Yates in 1941. It was, however, important constantly to obtain new field experimental evidence. Crowther had suggested that some farmers might be persuaded to crop a number of fields exhaustively, i.e. with nitrogen but without phosphorus of potassium, so that suitable

sites could be chosen on which to test new products.

In Dr. Stewart's view the problem of an ideal range of fertiliser mixtures was intimately linked with the questions of fertiliser practice and fertiliser profitability. 'We ought to know what the farmer should be using for his principal crops in different parts of the country; what he is in fact using and how much profit he was losing by not applying the optimal amounts of the right kinds of fertiliser'.

Chemical Industry Medal

Presented to Union Carbide Man

DEVELOPMENT of the petrochemical industry in the US was sudden—almost explosive—and built upon the co-operation of men of daring vision with understanding, brave and brilliant management, said Dr. Joseph G. Davidson, vice-president of Union Carbide and Carbon Corporation, New York, on 28 October, in accepting the Chemical Industry Medal for 1955, conferred upon him for 'conspicuous services to applied chemisty'. Production of organic chemicals in the US that had reached only 14,000,000 lb. annually in 1920 was now about 3,200,000,000 lb. or nearly 230 times as great, Dr. Davidson pointed out.

Presentation of the medal took place at a meeting of the American Section of the Society of Chemical Industry, sponsor of the medal, following a dinner in the medallist's honour at the Waldorf-Astoria Hotel.

Mr. Morse G. Dial, Union Carbide president, traced Dr. Davidson's accomplishments against the background of what was now popularly known as the petrochemical industry and pointed out how vital his services had been to this prodigiously growing industry. Mr. Dial presented the medallist for the award and the medal was bestowed by Mr. Wallace P. Cohoe, past president of the (international) Society of Chemical Industry and New York chemical consultant. Mr. Raymond Stevens, vice-president of the Boston chemical consulting firm of Arthur D. Little Inc., presided as chairman of the American Section.

'In looking back over the past 35 years, I am amazed at the growth of what has come to be known as the petrochemical industry in the US', Dr. Davidson said.

Prior to the 1920s many chemicals such as acetone, acetic acid and methanol were made by processes that did not even faintly resemble the present processes. At that time, said Dr. Davidson, these three products were made by the destructive distillation of wood, the by-product, and sometimes the main product, being charcoal. The raw materials from which our present day petrochemicals were produced were not then available.

Dr. Davidson also spoke of the hydrogenation of coal. 'Coal is not just carbon as most people seem to believe but is instead a huge hydrocarbon macro-molecule. A little hydrogen along with temperature and pressure, causes this molecule to fall apart, but if the treatment is right it falls apart into rather large molecules instead of very simple ones'.

Of the cost of hydrogenation plant Dr. Davidson said that to deal with 1,000 tons of coal a day would require an initial outlay of $50,000,000 to $100,000,000. This Union Carbide thought was the minimum plant size for economic operation.

Bricks from Fly Ash

POWER stations are using pulverised fuel in increasing quantities and this is leading to a shortage of clinker for use as aggregate. At the same time the changeover is resulting in an increasing production of pulverised fuel ash, finely divided 'fly ash', which can be disposed of only at a cost of up to 10s. per ton.

The Building Research Station has now developed a process by which this former waste material can be pelletised and kilned to make good quality aggregates. It is reported that one firm is to produce 65,000 tons a year of aggregates at Battersea in this way, and other firms are interested.

The output of fly ash is now 2,750,000 tons yearly, enough to produce 4,000,000 cubic yards of aggregate, and this output is expected to increase to 4,000,000 tons yearly, sufficient to meet the expected demand.

The process involves the pelletising of raw ash with water followed by sintering. No fuel costs are incurred as the fly ash itself contains about five per cent unburnt fuel, sufficient to make the pellets self firing. At present the aggregate costs more than clinker.

Blocks made from the new aggregates are claimed to have better appearance and properties than clinker blocks.

Rubber Chemistry Division of ACS

Soviet Drive for Technological Lead Described

SOVIET Russia is believed to be spending one-fifth of her entire budget on education, with emphasis on mathematics and science, in an all-out drive for technological supremacy, said Dr. A. W. Davison, vice-chairman of the Engineering Manpower Commission of the Engineers' Joint Council, on 2 November. Dr. Davison was speaking at the 68th meeting of the Division of Rubber Chemistry of the American Chemical Society, held at Philadelphia on 2-4 November.

As a matter of self-defence, therefore, the United States must undertake to train enough scientists and engineers to retain its leadership in technology, which so far has protected it from attack. Dr. Davison, former director of research of the Owens-Corning Fiberglas Corporation, Newark, Ohio, is now a company consultant in chemistry and chemical engineering.

Describing the Soviet Union as a potential enemy 'Which is obsessed with the mania of world conquest and which sees in America the largest stumbling block to its accomplishment', Dr. Davison said:—

'No matter how low an opinion we may hold of the Russian ideologies, we dare not underestimate either their intellectual capacities or their willingness to work hard and long. They have been aware of their deficiency in technical manpower for many years, and they set about correcting it a long time ago, with customary meticulousness and energy.

State Will Pay

'In a dictatorship, and police state, where children are wards of the state, it is possible to ferret out, at an early age, those individuals possessing high intelligence characteristics and special aptitudes for science, and to channel them into schools and careers in science and engineering, and to keep them at it. And a capable boy or girl is not denied an education in Russia because father's income may not be adequate to carry the additional financial burden of sending his offspring to college —the state will foot the entire bill!'

Dr. Davison cited estimates that Russia, which graduated only 28,000 engineers to America's 50,000 in 1950, had nearly three times the output of engineers this year, with 54,000 to America's 19,000.

Actually, Dr. Davison said, there are two separate problems involved. One is a short-term effort to persuade more of the men and women already in college to become scientists or engineers.

As to the long-term problem, he asserted, 'everyone agrees that the key to its solution lies in the secondary school', but unfortunately there has been a sharp decline in the number of competent science teachers available. At present, Dr. Davison stated, more than 5,000 science teaching jobs are filled by teachers untrained in science.

Gruelling Test

A gruelling new test for rubber, which gives in one or two months answers that would require one or two years of actual tyre performance tests, was described in the opening paper of the meeting.

The method is designed to speed up the search for better chemical agents to protect tyres and other rubber products from cracking due to attack by the atmosphere, according to H. M. Leeper, research chemist of the Monsanto Chemical Company, Nitro, W. Va., who presented the report. C. L. Gable, research group leader with the Monsanto Company, was co-author of the paper.

The test employs a very thin ring, looking much like a rubber band, stamped from a sheet of the rubber composition to be tested, the chemist explained. The ring is looped over a support, a weight is hung from its lower end, and the whole assembly is exposed to the atmosphere out-of-doors.

'After two or three days a rubber ring which contains no protective chemical begins to stretch out rapidly because of the cracking occurring at its surface, and after five to seven days it breaks through, allowing the weight to fall', said Mr. Leeper.

'A similar ring, but containing a good antiozonant, is attacked much more slowly and may last from six to eight weeks before breaking'.

'It was believed as late as 1940', said Mr. Leeper, 'that the action of natural sunlight was the cause of cracking. However, a very

exhaustive study by the English scientist, R. S. Newton, placed the blame squarely on a single component of the atmosphere, ozone.'

The first tyres of man-made 'natural' rubber have given a good account of themselves in punishing road tests, it was reported by chemists of the Goodrich-Gulf Chemical Company and the Firestone Tyre & Rubber Company.

Described as superior to natural rubber in resistance to cracking, to attack by oxygen and heat, the new synthetic is a 'complete replacement' for natural rubber, with essentially identical properties, such as low heat build-up in truck tyre service and good retention of strength at elevated temperatures, the meeting was told. These are the properties unique to natural rubber that have made it vital to the construction of heavy duty truck and aeroplane tyres.

'Tree Rubber'

Production of 'tree rubber' in the laboratory, which promises to make America independent of foreign suppliers for a practical raw material for truck and aeroplane tyres, was announced last December as an achievement of a team of scientists at the B.F. Goodrich Research Centre, Brecksville, Ohio.

Also in August, the Firestone Tyre & Rubber Company announced that its researchers, two and a half years before, had shown by scientific tests that they had produced a synthetic rubber virtually identical with the natural material. The announcement stated that a Firestone pilot plant had been producing synthetic 'natural' rubber for two years, and more than 500,000 miles of tyre tests had been completed.

Dr. Frank K. Schoenfeld, vice-president in charge of research of the Goodrich Company, presented three reports written by Goodrich rubber chemists, describing Ameripol SN, the Goodrich version of synthetic natural rubber.

In the same session Dr. Frederick W. Stavely, director of the chemical and physical research laboratories of the Firestone Company, gave a report on 'Coral' rubber, the trade name his company has given its product because it resembles coral in appearance.

New rubber compounds that promise better performance, longer service life and improved appearance for white sidewall tyres, for moulding strips around refrigerator doors, and for other white or light-coloured rubber products were reported by Dr. D. B. Merrifield, research chemist of the Monsanto Chemical Company, Nitro, W. Va.

Research leading to new non-discolouring chemicals for vulcanising rubber and protecting it from deterioration caused by heat, age and the chemical attack of the atmosphere was reported.

By using a chemical of the dithioamine class as a vulcanising agent and a sterically hindered hydroquinone as a protective agent, it is possible to produce a white or light-coloured rubber that will have a long, colourful life and will not discolour enamels or other materials that come in contact with the rubber, the chemist said.

'This new protective system gives more effective protection to white sidewalls in tyres than that now obtained with the staining protective agents in black tyres', Dr. Merrifield asserted. 'The additional cost of using such a system for a white sidewall tyre is estimated to be nominal'.

'The moulding strips used on refrigerator doors or around the doors and windows of automobiles cannot contain discolouring protective agents because these chemicals migrate into the paint or enamel and cause discolouration. Consequently, rubber used in the many applications of this type is not protected as well as it might otherwise be.

Protective System

'It is readily apparent, therefore, that a serious need exists for a non-staining non-discolouring protective system which will give much more effective protection to the rubber than that now possible.

'Such protection has been found possible using a relatively new type of vulcanising system for rubber in combination with a long known protective agent which has not previously been useful in vulcanised rubber formulations. This new protective system gives more effective non-staining protection to white sidewalls in tyres than that now obtained with staining protective agents in black tyres. The additional cost of using such a system for a white sidewall tyre is estimated to be nominal.

'Use of the new system in protecting white rubber and in other applications where staining is a problem is expected to lead to improved tyre performance and appearance and to longer service life of rubber articles.'

Profiting from British Standards

by MR. G. H. BEEBY, Imperial Chemical Industries, Ltd., Chairman, Chemical Divisional Council, BSI

THE chemical industry has given its support to the British Standards Institution for more than a generation. The first Chemical Standard was published nearly 40 years ago. In 1931 the Royal Charter granted to the old British Engineering Standards Association was amended so that divisional councils could be established, and the chemical industry was formerly included within the scope of the newly-named Institution. The main objects of the Institution as set out in the Charter were:—

To co-ordinate the efforts of producers and users for the improvement, standardization and simplification of engineering and industrial materials so as to simplify production and distribution, and to eliminate the national waste of time and material involved in the production of an unnecessary variety of patterns and sizes of articles for one and the same purpose.

and

To set up standards of quality and dimensions, and prepare and promote the general adoption of British Standard specifications and schedules in connection therewith and from time to time to revise, alter and amend such specifications and schedules as experience and circumstance may require.

Thus the Institution came into existence, and has remained, a body concerned to promote voluntary standardization in the interests of the industries themselves, and of those whom industry serves. It is financed mainly by subscriptions from industrial organisations and firms large and small, supported by a Government grant, and the 15,000 members of the 2,364 technical committees, drawn largely from industry, give their services voluntarily.

The Institution provides the facilities for representatives of all interests whether producers or users, executives or technicians to work out agreed specifications acceptable to all. It has evolved an extensive system of consultation with trade, professional, government and user organisations. It provides office services, and technically qualified staff whose task has been defined by Mr. H. A. R. Binney, the present director, as follows: 'BSI officials may not and will not adopt partisan rôles. Our job is to hold the ring, and to see that everybody gets a fair shout and a fair hearing. At the same time we are intent on seeing that business is conducted with due celerity, that decisions are reached with the minimum expenditure of time and that, as far as we can help towards it, the decisions are the best. Standards do not come just from putting everybody's ideas into a pot, shaking it around and coming up with an average'.

The first standard was published in 1903. By 1950 there were some 1,500 standards. In the past six years, such has been the demand for the Institution's services, this figure has nearly doubled. The Institution's annual sales of standards now amount to close on a million copies.

WORK OF THE CHEMICAL DIVISION

When the Chemical Divisional Council was set up the scheme was welcomed by the Association of British Chemical Manufacturers as 'recommend(ing) itself in every possible way to chemical people. . . They feel that in giving them the Chemical Section the Association (BSI) has acted with great wisdom'.

The Chemical Divisional Council, of which I am chairman, now has 20 Industry Standards Committees. These committees cover adhesives, disinfectants, fine chemicals, heavy chemicals, oils, fats and greases, pest control products, petroleum, photographic industry, pigments, paints and varnishes,

plastics, tar products, and wood preservatives as well as eight related industries such as the dental and rubber industries and scientific glassware and surgical instruments, and they have so far set up 358 technical committees to consider and prepare standards.

Last year (1954/55) the 12 Chemical Industry Committees mentioned above published 19 new and 11 revised standards. The Chemical Engineering Committee reports to the Engineering Divisional Council and there are now some 90 standards on the Sectional List for Chemical Engineering. The object of these committees is to prepare standards, but their achievement can be measured only by the extent to which these standards are useful to industry. The standards themselves range from simple glossaries of technical terms for the benefit of the many to highly specialised technical works comprehensible only to the expert.

WHAT STANDARDS DO

Standards mean economies in the present and development in the future. The Hon. Herbert J. Hoover, the distinguished engineer who became President of the United States, summarised one aspect of their usefulness as follows: 'They are at the back of all mass production. . . . They have sharpened competition. They have cheapened the cost of production in millions of directions. Thus they have enabled thousands of different articles to be placed within the reach of everybody. They do not impose uniformity on the individual, because they make available to him an infinite variety of additions to his living.'

Standards affect the individual producer in a number of ways:—

(a) They reduce an unnecessary variety of types and sizes of materials and products intended for the same purpose and which, by differing only in detail, may add disproportionately to the cost of manufacture.

(b) They provide reliable criteria on which industrial buyers can assess the quality of the materials they buy, and through which the ultimate user can be assured that a complete product bought to BS Specification will carry out the function intended.

(c) They establish nationally agreed descriptions and definitions, which eliminate ambiguities and speed up ordering. They provide methods of test and sampling so that goods can be described precisely as meeting the requirements of a test, and can be accurately identified by both parties to a contract. They also enable tenders to be placed and considered on a comparable basis. This not only helps the buyer and leads to fairer competition for orders between firms generally, but may enable the small firm to tender where otherwise the office work involved in preparing detailed itemised tenders might be beyond its resources.

(d) Exporters are beginning to depend more and more on standards to help them find a ready market overseas for goods which they can offer as complying with national or internationally agreed standards.

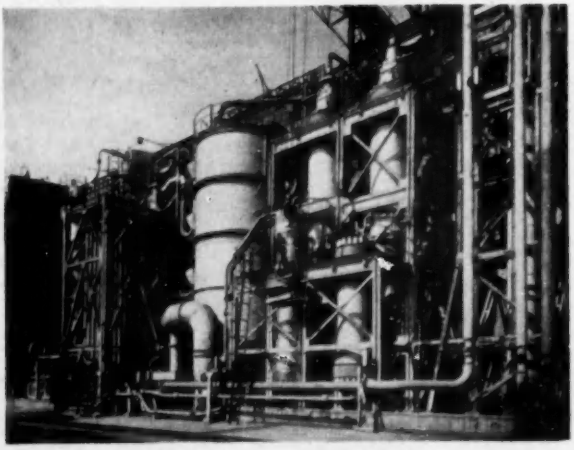
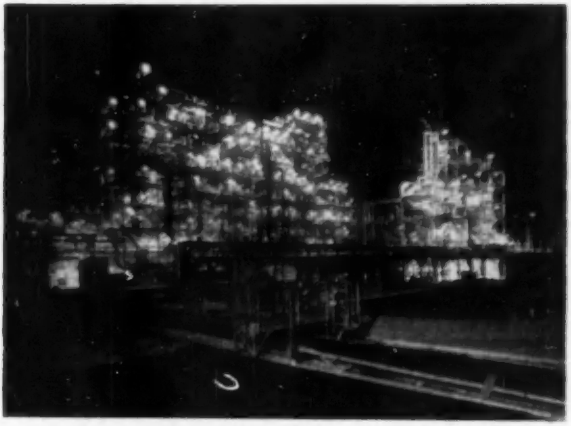


Photo by courtesy of ICI Ltd.

This nonanol plant incorporates the requirements of many British Standards: those for iron and steel, dimensions, tubes, rivets, nuts and bolts, electric lighting, jointing materials, washers and railway rails are just a few which this picture calls to mind



This honeycomb of engineering, an olefine plant operating at night, incorporates the advantages of hundreds of British Standards produced by BSI's Engineering, Chemical and Building Divisions

and can describe in terms which the buyer will understand.

REDUCTION OF VARIETY

Simplification is the main object of standardization. It may be achieved by deciding, for example, which shapes and sizes of a particular product are the most important to the user, and concentrating production on them. Thus BS 1262 now specifies a limited range of standard diameters for paint tins, where one firm alone previously produced 800 separate versions. Small differences in design are often due to inadequate knowledge of the performance of a given material. Standards can eliminate this, and use of standard parts not only releases designers and technicians for more creative work, but may provide economics in stock-keeping records, longer runs, and easier replacement. When the American Standards Association recently published its standard for centrifugal pumps it estimated that the United States chemical industry might save $6,800,000 a year by applying it.

Simplification does not mean uniformity or rigidity; it should not eliminate imaginative development, but rather stimulate it. The skilled technician who might previously have wasted his time trying to adapt to his firm's programme a piece of equipment differing only in small degrees in shape or size from others, can save much time by using standard equipment, such as cast-iron steam jacketed pans to BS 186, or hydro-extractors and centrifugal machines to BS 767.

STANDARDS OF PERFORMANCE

Much time is saved if tests can be applied to particular products in laboratories throughout the country to give comparable data. The chemical section of the Institution was responsible for some of the earliest standard tests to be published. These have been published even in the admittedly difficult field of biological testing, thus BS 541 'Technique for determining the Rideal-Walker co-efficient of disinfectants,' which has been used for over 20 years, was one of the first examples of the use of a standardized technique for a biological test. It is now incorporated as one of the principal criteria for testing in BS 2462 'Black and White Disinfectant Fluids' published only last year.

AGREED DESCRIPTIONS

There are many ways in which quotation of these can simplify the relation of buyer and seller and eliminate not only unnecessary paper work (and executive thought, not to mention simple orthographic difficulties) in the quotation of lengthy descriptions, but also often experimental work or testing by the manufacturing firm of samples differing only in inessential ways. Thus BS 1831 'Recommended Common Names for Pest Control Products,' helps the agricultural community (most of whose members have naturally not had the benefit of training in chemistry) to place orders for what may be very complex chemical formulations. BS 144, 'Coal Tar Creosote,' has been used for over 30 years as the basis of Post Office maintenance of telegraph poles and by British Railways for sleepers; and the series of standards for soaps (BS 1910/14)

are commonly used as the basis of orders by many large organisations such as hotels and hospitals.

In some cases user organisations have found it so helpful to have a common standard to ensure themselves of the quality of raw materials they buy, that they, rather than the producer, have initiated work on standards. Thus standards are now under consideration based on the work of the Society of Glass Technology, for raw materials such as sand and limestone, used by the glass industry, and the dairy industry uses a standard (BS 998: of 1941) for pure vacuum salt which specifies chemical purity, moisture and fineness of grain.

Purchasing Simplified

Many large using organisations, such as government departments, have found standards a useful means of simplifying their purchasing organisations. In the absence of a British Standard such buyers may set up their own standards and if there are several large buyers with slightly differing standards this may mean difficulties for their suppliers. Moreover, it is usually better for the producer to be represented and to make his difficulties known when the standard against which he has to sell is drawn up. The Service Departments have, for instance, shown themselves very willing to use the machinery of the British Standards Institution and to consult the relevant Industry Standards Committees.

It is also interesting to note that big users from different industries of types of major equipment for which there are at present differing standards are now combining in some cases to consider the preparation of a standard common to different industries—a further simplification which may lead to considerable manufacturing economies. The Institution has a joint committee of representatives of the chemical, petroleum and engineering industries to co-ordinate the work being done in these fields. BS 1500, the widely used standard on Fusion Welded Pressure Vessels for use in the chemical and allied industries is one of the more important standards resulting from this collaboration between these industries; and the Chemical Engineering Committees of the Institution maintain very close touch with the Engineering Equipment Users' Association.

In recent years the increased complexity of international trade has led to a multiplication both of national standards and of internationally agreed recommendations on standards. The time has passed when the British exporter could sell abroad on his name alone. He must increasingly meet a variety of specifications from overseas buyers, often expressed as private or national standards. The International Organisation for Standardization (ISO) which now has 37 Member Countries, exists to co-ordinate the work of the many national standards bodies and to draw up common recommendations which often form the basis of national standards of member countries.

As an exporting country, the United Kingdom could not, even had it so wished, neglect to play a full part in the work of ISO. As a member country we have the opportunity of ensuring that international recommendations which are becoming increasingly popular as the basis of specifications used, for instance, by Indian firms in placing orders, are suited to the practice and techniques of the British exporter, and that he in turn is aware of new developments overseas. In some cases the United Kingdom, as a pioneer in standards work in some particular field, has also been able to take the lead in formulating an international standard. There are obvious advantages in securing that an internationally accepted specification is based on one already current in this country. As a result of the comprehensive work done in this country on the preparation of standards (totalling about 40) for organic solvents, the United Kingdom was by common consent offered the leadership of the international working group dealing with this subject and the draft standards accepted by the working group derive largely from British Standards. Another field in which the United Kingdom may hope to influence the agreements reached is that of aromatic hydrocarbons, where we also hold the Secretariat, as a result of our pioneering work on standards in this field.

Prevents Loss of Trade

Again there may be cases where British industry must keep abreast of standards work in other countries or risk losing trade. The British Standard Code 1500 'Fusion-Welded Pressure Vessels,' is now widely used where previously in the absence of any nationally agreed standards, the industry's customers were tending increasingly to quote the US and German codes.

Industrial nerve centres such as this are built around the many British Standards for instrumentation, safety, lighting etc. Standards serve industry all along the line: from the initial handling of raw materials to the emergence of the end product

Photo by courtesy of ICI Ltd.

We in this country can no longer afford either to lag behind other countries in the preparation of standards, or to cling to standards embodying special qualifications unacceptable to our customers.

PROBLEMS OF STANDARDIZATION

Whether inspired by producers or users, by national or international considerations, standardization will grow. It should bring many benefits to the chemical industry but it also brings problems which we cannot leave unsolved. One of the problems is inherent in the organisation of our industry. It is easy enough for large concerns to find the personnel and the means of making their views known on BSI Committees. It is not so easy for small firms with fewer resources. But it may be vitally important for them that their production methods should be taken into account in the formulation of any standards. In some sections of the industry this may not always be happening. We must find ways of seeing that, in future, the small firm can play its full part in the formulation of new standards.

Then again it is easier for new industries with new traditions to draw up standards covering their production methods. The plastics industry has been zealous to protect its members against loss of reputation from the production of shoddy goods, and the Federation has taken a lead in preparing standards for consideration by BSI Committees. There are now over 40 standards for this industry.

Some other longer established industries have made less progress. This is not unnatural. Statute law is easy to write. It is much less easy to codify common law. A new industry breaking fresh ground can draw up its standards as it proceeds; an old one with long established traditions and complex methods finds it much harder to clarify its practice. There is, however, perhaps a danger that in some sections of the industry excessive caution and fear that standards involve the publication of private techniques may be discouraging firms from supporting standardization of techniques which may already be common to their competitors. Of course, firms must keep their trade secrets, but if they hold back from all standardization, even of processes which they know to be in general use, they may find themselves either having to tender against orders based on standards prepared without consideration of their viewpoint, or losing trade abroad because their customers have turned to a new national standard or international recommendation.

We must, in short, take an interest in standards. There is no easy measure of how much standardization would benefit a particular section of an industry; how much would be superfluous. We must weigh this for ourselves. Sometimes we need more standards, sometimes we may after due consideration decide that a particular standard is not necessary, or even that an existing standard has become out of date or meaningless. But we must be sure that we do consider each case on its merits, and that no opportunity is being neglected. No firm in the chemical industry can afford not to be a member of BSI.

APV in Crawley

THE final stage in the transfer of the APV Co. Ltd. to their new works at Crawley, Sussex, will be completed towards the end of December when the administrative, sales, technical and drawing office staff move into the new block of offices. The laboratories moved early in November.

The APV Company commenced the transfer of their four works in London and Slough towards the end of 1952. The operation was organised in three stages—first the engineering division and the foundries of APV-Paramount Ltd., then the fabrication division and now finally the administration and staff.

This represents an unusually complex and complete removal of an industrial unit for most of the 2,000 works and office personnel now employed at Crawley have been transferred from London. They have been provided with houses in Crawley New Town whenever required.

The company will now be accommodated in an entirely new factory that is claimed to be one of the most modern production and process engineering units of its kind in this country.

From 24 December all communications should be addressed to the APV Co. Ltd., Manor Royal, Crawley, Sussex, telephone number Crawley 1360, except those for the chemical engineering department which will be accommodated, together with the company's London office, at an address which will be announced later.

New Carbon Blacks for UK

PLANS to produce HAF and other new grades of furnace black in the United Kingdom have been announced by United Carbon Co. of Charleston, West Virginia, following the recent visit to this country of Mr. Oscar Nelson, vice-president of the company, and Mr. Wayne Herkness, director of overseas operations.

Plant to produce Kosmos 60 and Dixie 60 (United's HAF blacks) will be installed at the Swansea works of United Carbon Black Ltd., which has for some time been producing black under licence from United Carbon Co. and marketing it as Dixie 45 and Kosmos 45 through Anchor Chemical Co. Ltd., and Chance & Hunt (a section of ICI). Production of the HAF blacks is expected to begin in the spring of 1956. The new plant will also produce ISAF and FEF grades.

Another new development by United Carbon Co. is the acquisition of the former US Government synthetic rubber plant at Baytown, Texas. Production from this plant, consisting of GR-S/carbon black rubber masterbatch and oil-extended GR-S/carbon black masterbatch, will be marketed under the trade name 'Baytown' by Chance & Hunt and Anchor Chemical Co. Ltd.

Dr. D. M. Parkinson, late of the Dunlop Rubber Co. Ltd., recently joined United Carbon Co.'s staff, and is now in the US visiting the company's plants and laboratories. He is expected to make visits at frequent intervals to keep abreast of American developments. Dr. Parkinson will live in Great Britain and will co-operate with Chance & Hunt and Anchor Chemical Co. Ltd., in technical service matters. United Carbon plans to establish a laboratory near London to enable Dr. Parkinson to continue his research activities.

Manganese from Slag

AN emergency method to recover urgently needed manganese from open-hearth steel-furnace slags is described in a Bureau of Mines report released by the Secretary of the US Interior, Mr. Douglas McKay.

Called a lime-clinkering carbonate-leaching process, the method was tested by the Bureau in co-orporation with the American Iron & Steel Institute as part of a programme to increase the nation's self-sufficiency in manganese, an essential element in making steel.

The open-hearth slags discharged yearly as waste from domestic steel plants contain almost as much manganese as the steel industry consumes annually. Therefore, development of a method for recovering a substantial portion of this manganese would strengthen the United States' position in a highly strategic commodity, the Bureau commented.

Pilot-scale tests have shown that the process is technically feasible and, in an emergency, might provide substantial quantities of manganese. Although the method is costly, the report says it yielded a high-quality product that would demand a premium price on to-day's market for making steel and special alloys.

International Congress

PRESIDENT of Honour at the 1st International Congress on Documentation of Applied Chemistry to be held from Tuesday, 22 November, to Friday, 25 November, at the Institut Francais du Royaume-Uni, Queensberry Place, South Kensington, London SW7, will be the Rt. Hon. Lord Cherwell, C.H., F.R.S., Professor of Experimental Philosophy at Oxford University.

The congress, sponsored by the International Union of Pure & Applied Chemistry, will be confined to applied chemistry, and is the first conference at international level at which attempt has been made to bring together librarians, information officers, and applied chemists.

Scientists and experts on documentation from several European countries and the US will be attending and the congress starts with two sessions on the international and national scenes. On Thursday, 24 November, two sessions will be devoted to particular problems with Professor Velander of Sweden, and Professor Nasini of Italy, in the chair. On the morning of 25 November Professor Noyes of the US will discuss the future. Sir William Ogg, M.A., B.Sc., Ph.D., LL.D., F.R.S.E., will give the Valedictory Address.

Those wishing to take part in the congress should send a registration fee of two guineas to: The Hon. Secretary, The 1st International Congress on Documentation of Applied Chemistry, 56 Victoria Street, London SW1. Registration will also take place at Imperial Chemical House, Millbank, London, on Tuesday, 22 November, from 8.30 p.m., where a reception is to be held.

Plastics Sales Increases

Chemical Products Committee Figures

SALES of plastics materials in OEEC countries are shown by figures which have been compiled by a plastics materials working party of the Chemical Products Committee of OEEC. This working party, consisting of industrialists and officials of member countries, was set up last year in order to improve European statistics on plastics materials.

The full report drawn up by the working party will be published in December in the annual report of the Chemical Products Committee.

The figures at present available give sales in the countries concerned for the years 1950, 1953 and 1954, first as totals and then divided into four main sub-groups; thermosetting resins, thermoplastic materials, cellulose derivatives and hardened casein. Figures of sales and not production have been used in almost every case to avoid the duplication possible in the use of production figures.

In every case the total sales have increased in the three years under review. For example the UK figures (in metric tons) are: 1950—160,400, 1953—216,100, 1954—278,100. The most notable increase has been by Germany, from 98,000 metric tons in 1950 to 326,000 metric tons in 1954.

Thermoplastics as a group have shown the greatest general increase. This group includes polythene, PVC, polystyrene and acrylic resins. In this country the sales have trebled since 1950, going from 40,000 to 120,000 metric tons. Increases in other countries have generally been of the same order, for example the Swedish figures, which are expressed as production rather than sales, increased from 1,900 to 5,000 metric tons in the same period.

The table below shows the total figures for OEEC countries.

Total Sales of Plastics Materials in OEEC Countries

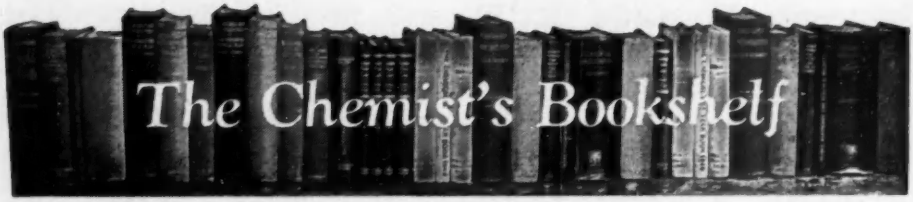
Unit: Metric tons

	1950	1953	1954
Austria	1,900*	4,700*	7,400*
Belgium	5,000	10,750	14,100
France†	33,368	52,545	84,770
Germany	98,000	241,000	326,100
Italy	22,829	51,623	76,863
Netherlands	11,366	15,802	21,646
Norway†	854	4,354	7,063
Sweden†	14,500	20,900	27,800
United Kingdom	160,400	216,100	278,100
Total	348,217	617,774	843,842
United States	908,185	1,140,500	1,146,625

* Minus collodion and vulcanised fibre.
† Production.

Phenol & Acetone By-Products

Phenol and acetone will be among products produced at the oil cracking plant now being built to process the output of the Nagylengyel wells at Szony, in north-west Hungary. Diesel fuel oil will be made from the crude oil of high bitumen and sulphur content found in this area.



THE ROGER ADAMS SYMPOSIUM. By W. R. Brode, *et al.* John Wiley & Sons, New York; Chapman & Hall Ltd., London. 1955. Pp. ix + 140. 30s.

Roger Adams is one of the best known American organic chemists. He has worked on hemp and *Senecio* alkaloids, gossypol from cottonseed oil and various pharmaceuticals but it is his work on restricted rotation in diaryls which is familiar to us all. Over a period of 30 years Professor Adams has turned out an average of no less than one paper a month in addition to which he has edited 'Organic Synthesis', 'Organic Reactions', 'Organic Chemistry', and 'An Advanced Treatise', and written other books. It is therefore natural that on his retirement from the Headship of the Chemistry Department of the University of Illinois his many past and present students should honour him. They did so by holding a symposium at which papers reproduced in this book were presented.

These are five in number, namely 'Steric Effects in Dyes' by W. R. Brode, 'The Structure of Gliotoxin' by J. R. Johnson, 'The Structure of Nepetalic Acid' by S. M. McElvain, 'Chemistry of Flavylium Salts' by R. L. Shriner and 'Some Chemical Studies on Viruses' by W. M. Stanley. Each paper surveys fields investigated by these outstanding students of Adams and their research schools including work not yet published elsewhere.

The book is most handsomely and copiously illustrated by photographs, diagrams and structural formulae. There is some evidence of hasty preparation in occasional inconsistencies such as the mention on p. 54 of '*dl-p*-nitrophenylacetic acid, which was resolved, diazotised and coupled' There is no index. Every organic chemist will find much to interest him in this volume. The paper on viruses is recommended to the general reader.—M.C.

THALLIUM POISONING. By J. J. G. Prick, W. G. Sillevis Smith & L. Muller. Elsevier Publishing Co., Amsterdam; distributed by Cleaver-Hume Press Ltd., London. 1955. Pp. 155. 19s.

While thallium compounds are not likely to constitute an industrial toxic hazard in the accepted sense, it is important that medical men and workers in the field of chemistry should know something of their action on the human organism.

The reasons for this are two-fold, first of all a small proportion of unduly sensitive individuals may be affected by contact with the substance in industrial processes; the second and more important reason is that on account of its physical characteristics—or lack of them—thallium is an ideal agent for murder, suicide or the production of illness in either one's-self or others.

The authors of this little book have attempted to summarise knowledge obtained from the literature and integrate it with their own observations; their attempt has been most successful. Descriptions of the wide range of signs and symptoms which may arise from the ingestion of thallium are supported by case histories, and photographs of a case of thallium poisoning are most instructive. In addition to the effects during life, post-mortem findings are adequately dealt with and there are excellent microphotographs of changes in the central nervous system.

The section on treatment (page 81) is not, unfortunately, up to the standard of the rest of the book by reason of the lack of specific instructions. This section would have been better if the authors had described in detail the regime they have found to give the best results, and had not tried to give a comprehensive list of measures recommended by others.

This, however, reduces only slightly the value of the book, which can be thoroughly recommended to all who have an interest in toxicology.—J. R. GIBSON.

HOME

Head Wrightson Get Contract

Head Wrightson Processes Ltd., of London, have received an order from a Government department for the largest induced draught cooling tower installation of its kind in the United Kingdom.

£3,000,000 Factory

The Goodyear Tyre & Rubber Co. is to build a £3,000,000 factory on a recently acquired 58-acre site at Garscadden, Glasgow.

Telex Number

As from Monday, 21 November, a Telex installation will be in operation at the Southampton office of Leicester, Lovall & Co. Ltd., manufacturers of synthetic resin and casein glues. The Telex number is 47-526.

B.C.M.A. Dinner

The British Colour Makers' Association held its annual dinner at the May Fair Hotel, London, on Wednesday, 2 November, the retiring chairman, Mr. J. H. Grimshaw (Horace Cory & Co. Ltd.), presiding. There were 44 representatives of members and staff of the association present and the principal guest was Dr. W. H. Garrett, M.B.E., J.P., a director of Monsanto Chemicals Ltd., vice-president of the British Employers' Confederation, and a past chairman of the Association of Chemical & Allied Employers.

Exoneration

On page 1017 of our issue of 5 November we published a correction regarding the newly elected officers of The Association of British Chemical Manufacturers. Now we would like to make it perfectly clear that the errors made were in no way due to any information distributed by the office of the ABCM and that none of the ABCM staff were in any way to blame.

Shell 'Skyscraper' Offices

Approval has been given by London County Council to a height of 338 ft. for the tower block of the 'skyscraper' offices which Shell Petroleum proposes to build on the South Bank site. The tower will be 25 storeys high and will be the highest fully occupied building in London. The premises will accommodate staff now in about 20 offices in London.

Sheffield Office

To meet increased demands for industrial instrumentation and automatic controls for space heating, ventilation and air-conditioning, Honeywell-Brown Ltd., have moved to larger offices at 119 Petre Street, Sheffield 4. Two years ago the company opened its first office in Sheffield.

Polarographic Analysis

At a special joint meeting of the Midlands sections of the Society for Analytical Chemistry and the Royal Institute of Chemistry in the Main Chemistry Theatre of the University of Birmingham on 25 November at 6 p.m., Professor J. Heyrovsky, Ph.D., D.Sc., of the Central Institute of Polarography, Prague, will give a lecture entitled 'Modern Trends of Polarographic Analysis'.

New Trade Guild

At the annual convention dinner of the Scientific Instruments Manufacturers' Association on 12 November it was announced by Mr. C. E. T. Cridland, president, that a new guild, that of Scientific Instruments Makers, has been formed. If it receives a grant of livery it will take its place among the Livery Companies of the City of London.

Walkie-Talkie Radio

Fire patrol men at ICI Nobel Division are being equipped with walkie-talkie radio sets to enable them to maintain close contact with the fire patrol officer's car in the event of emergency.

Exemptions from KID

The Board of Trade is considering the question of the renewal for the period 19 February 1956 to 18 August 1956 of the exemptions from Key Industry Duty as set out in the Safeguarding of Industries Exemption Orders (Nos. 6 & 7) 1955 and in any further Exemption Orders which may be made before 19 February, 1956, under Section 10 (5) of the Finance Act 1926, as amended by subsequent enactments. Lists of articles exempted from KID by these Orders until 18 February 1956 were published as Statutory Instruments 1955 (Nos. 1278 & 1380). Communications should be sent to the Tariff Division, Board of Trade, Horse Guards Avenue, London SW1, not later than 3 December.

• OVERSEAS •

Japan to Make Polythene

The Sumitomo Chemical Company of Japan has contracted to use the ICI technique for the production of polythene. If the contract goes through, Sumitomo will make an advance payment of £500,000, it is reported by Japanese sources.

Fertiliser Deal

Egypt is to be supplied with 260,000 tons of fertiliser by the Soviet Zone of Germany it was stated on 15 November by Dr. W. A. Menne, a director of Farbwerke Hoechst. The deal is expected to involve about £3,700,000.

Canadian Sulphur Plant

Construction of a sulphur plant in the Pincher Creek field, 125 miles south of Calgary, Alberta, has been announced by Canadian Gulf Oil Co. Ltd. The plant, described by officials as the largest in Canada, will produce 225 tons of sulphur and 1,900 barrels of condensate a day from 255,000,000 cu. ft. of natural gas. It is scheduled to go into production next September.

Shawinigan Developments

The Du Pont Co. of Canada is to carry out a $1,000,000 expansion programme at its Cellophane cellulose plant at Shawinigan Falls, Quebec. It will be the third expansion scheme undertaken this year by the company to increase the production of packaging film. In September a packaging laboratory was opened in Montreal, and next month the $700,000 addition to the shipping and general facilities section of the Shawinigan Falls plant will be brought into use.

Aluminium Output Plans

In a recently published White Paper the Norwegian Ministry of Industry outlines plans for increasing the output of the Ardal aluminium plant by 36,000 tons a year at a cost of £19,725,000. The Government company producing aluminium at Ardal and Sundalsöra, has, says the Ministry, reached a provisional agreement with the Aluminium Co. of America for borrowing $20,000 000 against repayment in aluminium over a 10-year period from 1961. The American Co. will also supply aluminium oxide for the Ardal plant.

US Synthetic Rubber

US exports of synthetic rubber in September this year were the highest since 1946 when large shipments went abroad to alleviate war-caused shortages of natural rubber. In September 11,672 long tons, valued at $7,551,870, were exported, bringing the value of exports for the first nine months of the year to $39,821,986.

France to Import Greek Olive Oil

The French Government has agreed to the import of olive oil from Greece and the first permit issued is for oil valued at £5,100.

Plastics Expansion

Plans for extending the plastics industry in Hungary during the second Five Year Plan, starting next year, includes the addition of new sections to the Viscosa factory at Nyergesujfalu for the production of Perlon and Orlon.

Aluminium Plant in Pyrenees

Aluminio y Aleaciones SA, is to build an aluminium plant at Sabiñanigo in the province of Huesca, Pyrenees, for producing 99.99 per cent purity aluminium for the manufacture of semi-finished products such as aluminium paste. A new company with £440,000 capital will be formed to operate the factory.

NZ Uranium Ore Strike

Commenting on the recent discovery of uranium ore on the West Coast of New Zealand's South Island, Mr. R. W. Willett, a senior geologist of the NZ Department & Scientific Research, said: It is easily the best material seen in New Zealand. Scientists found that the samples of the ore contained 0.27 per cent uranium, more than twice as much as the rich uranium ores of Australia's Rum Jungle.

Private Atom Reactor

Twelve Canadian companies in the rubber, oil, chemical and other industries have been invited by the Pulp & Paper Research Institute of Montreal, and Isotope Products, of Oakville, to study a scheme to build an atomic reactor at a cost of about $1,500,000 for their specific industrial purposes. Several of the companies have agreed to participate, the others will give their decisions by the end of this month.

· PERSONAL ·

The following elections and co-options were made at the November meeting of the ABCM Council to fill vacancies: *Elected Members*: MR. D. J. BIRD (Fisons Ltd), MR. E. LE Q. HERBERT (Shell Chemical Co. Ltd.), and MR. F. S. POOLE (Peter Spence & Sons Ltd.); *Co-opted Members*: MR. E. J. BUSH (W. J. Bush & Co. Ltd.), MR. G. H. W. CULLINAN (Shell Chemical Co. Ltd.), MR. R. S. HASKEW (The General Chemical & Pharmaceutical Co. Ltd.), and DR. J. E. TAYLOR (Joseph Crosfield & Sons Ltd.).

MR. EDWARD J. WOODHEAD has been appointed assistant export sales manager of James A. Jobling and Co., of Sunderland, makers of Pyrex glass.

MR. A. C. SNOWDEN, a director of J. H. Minet & Co. (Home), and a member of Lloyd's, has joined the board of Hayward Tyler & Co., of Luton and Glasgow, designers and builders of pumps for oil cargo, oil refinery, and atomic energy applications.

MR. PHILIP S. RENDALL, a deputy chairman and managing director of Courtaulds Ltd., has been elected a vice-president of the British Man-made Fibres Federation.

MR. W. B. ALBRIGHT, managing director of Albright & Wilson Ltd., chemical manufacturers, has been appointed vice-chairman, with responsibility for overseas affairs. He will be succeeded as managing director by MR. S. BARRATT. MR. C. N. WILSON has been appointed secretary.

MR. J. V. KLEIN, managing director of Compoflex Co. Ltd., 26 Grosvenor Gardens, London SW1, was admitted to Guy's Hospital, London, on 7 November for an abdominal operation. He is expected to be in hospital for at least two weeks and is unlikely to return to his office until after Christmas.

DR. G. L. WILSON, B.SC., who has succeeded MR. W. MONTEITH, B.Sc., in the operating department, I.C.I. Ltd., Nobel Division, Glasgow, has been concerned with work study in the division for some years. Dr. Wilson joined the company in 1929 as a chemist in the research department and from 1936 till 1947 he held different posts in production, where he amassed wide experience. He came to the Glasgow office in 1947, and returned to Division Headquarters in 1951, where he was in charge of method study. MR. R. T. PIRIE, B.SC., has been appointed head of the method study section in succession to Dr. G. L. Wilson. Mr. Pirie joined Ardeer in 1951 as technical officer. He is by training an electrical engineer and graduated at Aberdeen University. Slightly more than a year after joining the company he was transferred to the motion study section of the work study department at Stevenston. MR. S. M. FARRER, B.Sc., A.R.I.C., who joined the company in 1942 has now been appointed head of the analytical laboratory section in the research department. Mr. Farrer succeeds DR. R. BURNS who has retired. Mr. Farrer took his chemistry training at Nottingham University.

E. M. HUNT, B.Sc., Ph.D., A.R.I.C., A.M.I.CHEM.E., has been appointed general manager, Styrene Products Ltd. Dr. Hunt entered the plastics industry in 1946 when he joined BX Plastics Ltd., Dundee, as colour chemist and subsequently as assistant production manager. In 1949, he moved to Erinoid Ltd., where he was a member of the production staff at Stroud, Gloucester. Transferred to the London office, he became personal assistant to MR. P. C. CHAUMETON, B.SC., F.R.I.C., M.I.CHEM.E., technical director of Erinoid and managing director of Styrene Products. It will be recalled that MR. L. H. WILLIAMS was recently appointed chairman of Styrene Products, following the acquisition by Shell Chemical Co. of Petrochemicals Ltd. and its holding in Styrene Products.

Dr. E. M. Hunt

HER MAJESTY THE QUEEN has approved recommendations made by the council of the Royal Society for the award of Royal

Medals to SIR ALEXANDER TODD, F.R.S., Professor of Chemistry, University of Cambridge, for his distinguished work in organic chemistry, and to PROFESSOR V. B. WIGGLESWORTH, C.B.E., F.R.S., Quick Professor of Biology, University of Cambridge, for distinguished experimental contributions of outstanding value to many aspects of insect physiology.

Honeywell-Brown Ltd. announce the appointment of MR. E. B. FOSKETT to the management of their Glasgow office. Mr. Foskett who has had wide experience in the application of industrial instrumentation and automatic controls, was previously attached to the company's sales engineering department. MR. D. J. VENNING, former manager of the Glasgow office, has been appointed to a senior position in the head office at Perivale, Middlesex.

At the annual general meeting of the British Colour Makers' Association on 2 November, the following officers and council members were elected: *chairman*: MR. H. GOSLING (Cornbrook Chemical Co. Ltd.); *vice-chairman*: MR. A. H. WHITAKER (James Anderson & Co. (Colours) Ltd.); *hon. treasurer*: MR. C. G. A. COWAN (Cowan Bros. (Stratford) Ltd.); *secretary*: MR. ALLAN J. HOLDEN, B.Sc., F.R.I.C.; *council*: MR. C. M. BEAVIS (Golden Valley Colours Ltd.); MR. A. S. CALLAGHAN (ICI Dyestuffs Division); MR. C. G. A. COWAN (Cowan Bros. (Stratford) Ltd.); MR. G. E. HILLIER (J. W. & T. A. Smith Ltd); MR. H. GOSLING (Cornbrook Chemical Co. Ltd.); MR. J. H. GRIMSHAW (Horace Cory & Co. Ltd.); MR. V. WATSON (Cromford Colour Co. Ltd.); MR. A. H. WHITAKER (James Anderson & Co. (Colours) Ltd.); MR. H. A. WILSON (The Derby-Oxide & Colour Co. Ltd.).

Shell-Mex & BP Ltd. announce that MR. H. CUNLIFFE has been appointed general manager of the industrial fuels section. This is a new appointment created by the company in view of the growing importance of the fuel oil section of their business. In 1951 the company appointed specially trained fuel efficiency officers in industrial areas to assist manufacturers to get maximum results from their equipment and fuel. Recently the number of these officers was doubled. Mr. Cunliffe, until this new appointment, was group manager of the company's northern group of divisions. He has been with Shell-Mex & BP Ltd. for 33 years.

A delegation of British atomic scientists left London on Tuesday on a six-day visit to Russia. SIR JOHN COCKCROFT, F.R.S., director of the Atomic Energy Research Establishment, Harwell, who was invited to make the visit by the Russian delegation to the recent International Conference on the Peaceful Uses of Atomic Energy, will be unable to take part because of his commitments in the UK. Members of the delegation are: DR. F. J. SCHONLAND, F.R.S., deputy director, AERE, Harwell; DR. WILLIS JACKSON, F.R.S., representing the Royal Society and the British Nuclear Energy Conference; MR. B. D. GOODLET, head of Engineering Research and Development Division, AERE; DR. J. V. DUNWORTH, head of Reactor Physics Division, AERE; DR. D. W. FRY, head of General Physics Division, AERE; MR. A. A. SMALES, head of Analytical Chemistry Group, AERE; DR. L. ROTHERHAM, head of Research and Development, Industrial Group, Atomic Energy Authority; and MR. J. C. C. STEWART, director of Technical Policy, Industrial Group, Atomic Energy Authority. The programme will include visits to an atomic power station, a powerful phasotron, the Lebedev Institute and the Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences of the USSR. The delegation will return on 22 November.

The Ministry of Agriculture, Fisheries & Food announce that in view of the impending retirement in autumn next year of the director, W. F. BEWLEY, C.B.E., D.Sc., V.M.H., the governing body of the Glasshouse Crops Research Institute has appointed MR. F. W. TOOVEY, O.B.E., B.Sc., A.R.C.S., A.I.C.T.A., director of the West African Institute for Oil Palm Research, to be his successor. So that Mr. Toovey can benefit from Dr. Bewley's experience as director of the Cheshunt, Herts, station, and more recently of the new Institute at Littlehampton, Sussex, it has been arranged that Mr. Toovey be appointed director designate as from 1 January. Mr. Toovey joined the Colonial Agricultural Service in 1935; in 1952 he became Director of the West African Institute for Oil Palm Research.

Publications & Announcements

LEAFLET No. 4 in a series, 'Methods for the Detection of Toxic Gases in Industry', has been issued by DSIR, price 1s. This deals with the detection of benzene vapour. Chronic poisoning from benzene may result from exposure over a prolonged period to concentrations of the order of 35 ppm. The blood forming organs suffer damage which is progressive and irreparable, giving rise to an anæmia with characteristic symptoms, and at a later stage bleeding from mucous membrane surfaces and under the skin. The method described consists of the absorption of benzene vapour in a solution of formaldehyde in concentrated sulphuric acid. Modifications have been made to the apparatus described in earlier leaflets on the subject to make the test more sensitive. A sample of the atmosphere is drawn through a specially designed U-tube containing the reagent by means of standard rubber bulb controlled by a capillary choke. The number of inflations of the bulb necessary to match the colour of the reagent to the standard colour is noted and the concentration of benzene vapour obtained from tables.

* * *

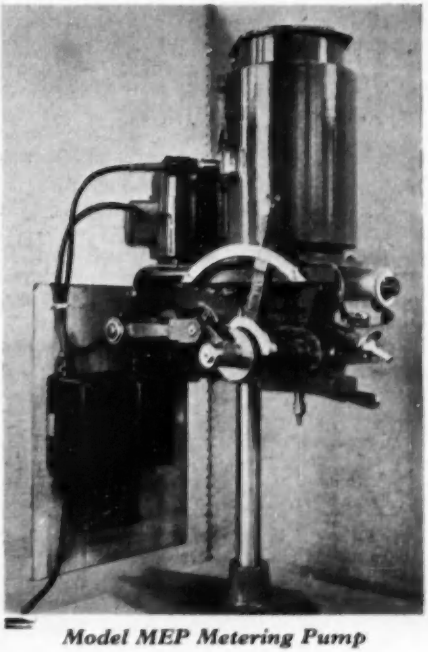
TO meet the demand for a heat-resisting glass that will afford protection during the use of light-sensitive chemicals, James A. Jobling & Co. Ltd., of Sunderland, Co. Durham, announce that they are now able to supply the majority of the items in their catalogue of laboratory and scientific glassware stained amber. These new products are made of the normal Pyrex glass, but are subsequently stained to produce the low actinic effect. The colour becomes an integral part of the glass and cannot be removed except by the action of abrasives or hydrofluoric acid. A list of available amber-stained Pyrex glassware is available from the makers and will be sent on request.

* * *

FOLLOWING ACHEMA XI there are, as anticipated, a few European catalogues of chemical equipment (ACHEMA 'Jahrbuch' 1953/55) available for those unable to attend the conference. The work was well received both at home and abroad and the lasting value of this work is determined by its extent (whole linen, Pp. 900) and the reliability and completeness of the information of more than 6,000 items of chemical equipment for research and industry, and by the fact that the whole text, including the list of suppliers, is in three languages, German, English and French. The price is DM.35 less 10 per cent for members of the European Federation of Chemical Engineering, plus DM.5.90 for postage and packing.

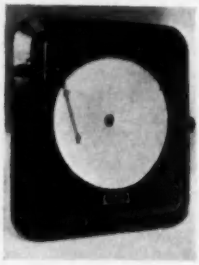
* * *

A NEW metering pump for the extrusion of all brush setting solutions incorporating a solvent and used in the manufacture of paint and wall brushes has been announced by The Brush Design Group, 5 Stonehills House, Welwyn Garden City, Herts. By the use of three different sizes of gear pump piston and an infinitely variable hand adjustment it is possible to cover a wide range of quantities in each ejection. Once set, this machine will extrude exactly even quantities with no after drip. A thermostatically controlled heater ensures true working viscosity without gumming or thinning the solution used. Enquiries should be made to the company stating the kind of fluid to be handled.



Model MEP Metering Pump

FIELDEN Electronics Ltd. of Manchester announce they have recently introduced a high performance, low priced recorder known as the Servograph Mark II, an extremely versatile instrument suitable for direct operation from *p*H meters, CO_2 indicators, smoke density meters, Beta gauges, tachometers and many other uses as well as a recording voltmeter and ammeter. The instrument, which operates directly from micro current sources, can replace any



The Fielden Servograph Mark II

moving coil indicating meter without imposing any additional load on the source of measurement or involving any loss of accuracy, claim the manufacturers. A feature of this instrument is its principle of operation which sets a new standard in performance for graphic recording meters. It is being marketed at a cost under £100 for the single point model, and is being manufactured in three different models available for use in the laboratory as well as on the plant.

* * *

THE expanding range of Foxboro Stabilflo control valves has been extended with the introduction by Foxboro-Yoxall Ltd. of a pneumatically operated control valve having a leakproof metallic bellows seal built in below the conventional stuffing box. The normal stuffing box is retained and becomes an emergency safety seal. The valve is designed for use on those processes involving liquids which cannot be allowed to escape (even in the minute amounts that might pass the conventional packing gland) because of the danger or loss involved. Such fluids include synthesis gas ($CO + H_2$) which is toxic; chlorine which is corrosive; toluene which is explosive and many pharmaceutical chemicals which are valuable. The valve also meets the requirements of processes under vacuum where no leakage is permissible because of vacuum loss or process contamination from the atmosphere. The bellows seal is housed in an adaptor spool assembled between the body and the bonnet of a Foxboro Stabilflo valve and extensive field experience has led to the development of advanced manufacturing techniques which result in a bellows with exceptionally long life and which continues to function perfectly after continuous difficult service, including both throttling and open and shut control valve applications. The bellows is protected from possible stroke over-range damage by being designed to handle the maximum stroke of the valve with a wide safety margin.

* * *

A PUBLICATION, 'The Principles of Argon-Arc Welding Aluminium' has been published by the British Welding Research Association, 29 Park Crescent, London W1, price 2s. 6d. This, a booklet of 18 pages, is the first of a series which will describe in detail the argon-arc welding of aluminium alloys. There will be six parts altogether, dealing with principles, electrical characteristics and equipment, metallurgical considerations, design applications and costs, techniques and procedures, and inspection and testing. After discussing the field of application of this type of welding the first booklet goes on to explain some of the basic points which must be observed if successful results are to be obtained.

* * *

CORROSION Engineering for the Chemical, Steel, Engineering and Allied Industries is the title of a leaflet published by Corrosion Proof Products Ltd., Sunleys Island, Great West Road, Brentford, Middlesex. The company claim that they offer a complete service in the design and construction of acid proof plant and vessel linings, floorings and protective coatings. They operate in all parts of the British Isles and many overseas territories including South Africa, Australasia and most European countries. A speciality of the company's technical department is the design and construction of effluent treating systems, and drawings and specifications will be provided for the approval of the appropriate river boards. Among acid proof materials available may be mentioned furane resin cements, cashew resin cements, silicate cements, bitumen and synthetic resin sealers and concrete hardeners and sealers. Copies of this leaflet will be sent to anyone who is interested.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

CLEVELAND PRODUCT CO. LTD., Middlesbrough, glue manufacturers, etc.—14 October, mortgaged to Martins Bank Ltd. securing all moneys due or to become due to the bank; charged on certain premises at the Docks, Middlesbrough, with plant, fixtures, etc. *Nil. 31 December, 1954.

INVENIT INDUSTRIAL PLASTICS, LTD., London WC.—18 October, charge, to Barclays Bank Ltd. securing all moneys due or to become due to the bank; charged on land and premises near Maidstone Road, Paddock Wood.

JETAL FINISHES (ENGLAND) LTD., Birmingham, industrial chemists.—18 October, mortgaged to Midland Bank Ltd. securing all moneys due or to become due to the bank; charged on 162 Victoria Road, Aston, Birmingham, with fixtures. *Nil. 3 September, 1954.

Receiverships

BALDWIN CHEMICAL INDUSTRIES LTD., London Road, Harlow, Essex, Douglas D. Mathieson, of 103 Cannon Street, London EC4, ceased to act as receiver and manager on 18 October, 1955.

Increases of Capital

M. L. ALKAN LTD., manufacturers of chemicals, etc., 3 & 5 Clements Inn, London WC2, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £10,000.

RIDLEY (WHOLESALE CHEMISTS) LTD., Collier Lane, Carlisle, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £30,000.

ATLAS PRESERVATIVE CO. LTD., manufacturers of preparations for preserving timber, stone, metals, etc., Fraser Road, Erith, Kent, increased by £18,676, in £1 redeemable preference shares, beyond the registered capital of £50,000.

UNIVERSAL FERTILISER CO. LTD., Wellington Mills, Laisterdyke, Bradford, increased by £9,700, in 700 ordinary and 9,000 unclassified shares of £1 each, beyond the registered capital of £300.

PEACOCK & BUCHAN LTD., manufacturers of compositions for ships' bottoms, and other anti-fouling compositions, etc., 173 Oakley Road, Shirley, Southampton, increased by £13,000, in £1 ordinary shares, beyond the registered capital of £1,000.

New Registrations

H. E. Stringer Ltd.

Private company (556,211.) Capital £100. To carry on the business of manufacturers of and dealers in chemicals, aromatic chemicals, essences, fruit extracts, perfume compounds, essential oils, etc. Directors: Harold E. Stringer and Mrs. Carolina G. Stringer. Secretary: H. E. Stringer. Reg. office: Central House, 55a High Street, Ruislip, Middlesex.

B.R.R. (Properties) Ltd.

Private company. (556,377). Capital £1,000. in £1 shares. Objects: To acquire all or any part of the freehold and leasehold premises and of the undertaking and other assets of British Recovered Rubber & Chemical Co. Ltd., etc. The directors are: Thos. A. Wilson, 3 Parnell Avenue, Northenden, Manchester; Geo. Woodroffe, 206 Manor Road, Droylsden, Lancs, directors of British Recovered Rubber & Chemical Co. Ltd. Secretary: T. A. Wilson. Solicitors: Gilditch Sons & Driver, Manchester. Registered office: 544 Ashton New Road, Clayton, Manchester.

Potash Fertilizers Ltd.

Private company. (556,348.) Capital £30,000 in £1 shares. The subscribers (each with one share) are: F. Thompson, 11 Old Jewry, E.C.2, solicitor's clerk; G. A. Smith, 44 Beech Road, Dartford, Kent, solicitor's managing clerk. The first directors are to be appointed by the subscribers. Solicitors: Clifford-Turner & Co., 11 Old Jewry, EC2.

H. N. Norton & Co. Ltd.

Private company. (31,104). Capital £1,000. To carry on the business of manufacturers, refiners, merchants of cosmetics, perfumes, toilet preparations, etc. Subscribers: W. S. Day and E. L. Watson, both of 178 St. Vincent Street, Glasgow. H. N. Norton, 36 Rouken Glen Road, Whitecraigs, Renfrewshire, is the first director.

Company News

Bowmans Chemicals Ltd.

The directors have announced that 500 £1 redeemable cumulative preference shares have been redeemed, leaving the number of preference shares now in issue at 41,584.

Fisons Ltd.

Sales for the year, including for the first time those of Fisons Pest Control Ltd., were £32,000,000 compared with £28,000,000 in the previous year. Group trading profit, including dividends from associated companies, and after deducting interest charges, was £2,656,276 compared with £2,956,476. An important reason for this decline in profit was the reduced margins on fertilisers. The fertiliser factories have all been working at full pressure during the year, and the triple superphosphate factory at Immingham achieved an output higher than its rated capacity. During the year Fisons Chemicals Ltd. became a wholly-owned subsidiary of Fisons Ltd., and despite increased competition the company stepped-up its exports. New derivatives of hydrazine, manufactured in this country only by Fisons Chemicals Ltd., became more industrially important and plans for increasing production are advanced. New product which will be added to the range is ethylene diamine for which a plant will shortly come on stream. This chemical has previously been imported from Germany and the US and is in demand as a raw material for fungicides, pharmaceuticals and adhesives.

International Nickel Co. of Canada Ltd.

The report of The International Nickel Co. of Canada Ltd., and subsidiaries for the nine months ended 30 September, 1955, issued by Dr. John F. Thompson, the chairman, shows net earnings, in terms of US currency, of $67,651,667 after all charges, depreciation, depletion, taxes, etc., equivalent, after preferred dividends, to $4.53 per share on the common stock. These earnings were the highest for any corresponding nine months in the company's history, exceeding by $20,221,000 the record of $47,430,561 established in 1954; equal to $3.15 per share of common stock. For the nine months ended 30 September, 1953, net earnings were $41,252,680, or $2.72 per share of common. At its meeting on 7 November the directors declared a dividend of 65c a share on the common stock and a year-end extra dividend of $1.35 a share. These, together with the dividends of 55c paid in the first and second quarters and 65c in the third quarter, will bring total payments for 1955 to $3.75. In 1954 dividends totalled $2.90, consisting of four 50c quarterly distributions and a year-end extra of 90c a share. In a letter to shareholders, Dr. Thompson announced that trial operation of the equipment in the first unit of the company's iron ore recovery plant near Copper Cliff, Ontario, has been started and that the plant is scheduled to go into commercial production soon. The plant employs an Inco-developed process for the recovery of nickel and of iron ore from nickeliferous pyrrhotite.

Porter Paints Ltd.

Mr. Cecil H. Porter, the chairman, presided at the 6th annual general meeting in London, on 8 November. The result of the first year's trading after reconstruction has proved satisfactory, showing a net profit, before tax, of £57,767, compared with £56,706. Sales from two Porter companies in London and Wales have increased in the industrial, woodworking and allied trades in stoving, synthetic, and cellulose materials during the year, and certain of the company's specialised finishes are now being made, under licence, in Canada, Australia, New Zealand, South Africa, and France. The board recommended a final dividend of eight per cent, making 16 per cent for the year.

Drugs from Wool Grease

Dr. Peter Woodford, of the Department of Textile Industries at Leeds University, has won a gold medal and a £150 prize with a treatise on the possibilities of converting the cholesterol and lanosterol found in wool grease into valuable drugs, such as cortisone. Dr. Woodford, who is 24, is a member of a research team investigating this particular field.

what have CJB *to do with*

tomorrow's breakfast?

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Next Week's Events

MONDAY 21 NOVEMBER

Institute of Metal Finishing

London: Imperial College, South Kensington, 6.15 p.m. 'The Use of the Electron-Microscope in Electrochemical Research' by A. Mohan, M.Sc.

Royal Society of Arts

London: John Adam Street, Adelphi, WC2, 6 p.m. First of three lectures to be held on successive Mondays. 'The Science of Brewing' by A. H. Cook, D.Sc., F.R.I.C., F.R.S.

Pharmaceutical Society of Great Britain

London: The Society's House, 17 Bloomsbury Square, WC1, 7.30 p.m. 'Some Pharmaceutical Aspects of Modern Cosmetics' by F. Atkins, B.Sc., F.R.I.C., M.P.S.

RIC (London Section)

Chatham: Medway College of Technology, Maidstone Road, 7 p.m. 'The Mechanics of Steric Hindrance' by Professor C. K. Ingold, D.Sc., A.R.C.S., D.I.C., F.R.I.C., F.R.S.

TUESDAY 22 NOVEMBER

SCI (Oils & Fats Group)

London: Rooms of The Chemical Society, Burlington House, Piccadilly, W1, 6.30 p.m. Joint meeting with the Society of Leather Trades' Chemists. 'Fats in the Leather Industry' by M. P. Balfe, B.A., Ph.D.

WEDNESDAY 23 NOVEMBER

Royal Society of Arts

London: John Adam Street, Adelphi, WC2, 2.30 p.m. 'Research in Industry' by K. Blount, M.A., B.Sc., D.Phil., F.R.I.C.

SCI (Food Group)

London: Rooms of the Chemical Society, Burlington House, Piccadilly, W1, 6.30 p.m. 'The Production of Processed Cheese in France & Switzerland' by W. G. Wearmouth, B.Sc., F.Inst.P., and 'Airborne Contamination of Foodstuffs by Rodent Hairs' by A. G. Sansome, B.Sc., A.R.I.C.

British Association of Chemists

London: The Wellcome Institute, 183 Euston Road, NW1, 7 p.m. 'Applications of Photography in Research & Industry' by B. Gorringe, Ph.D., A.R.C.S., A.R.I.C.

The Institute of Fuel

London: Institution of Civil Engineers, Great George Street, SW1, 5.30 p.m. 'The Design & Performance of Modern Gas-cleaning Equipment' by C. J. Stairmand, B.Sc., M.I.Chem.E., A.Inst.P.

SCI (Newcastle Section)

Norton-on-Tees: William Newton School, 7.30 p.m. 'The Work of the Brewing Industry Research Foundation' by A. H. Cook, D.Sc., F.R.I.C., F.R.S.

THURSDAY 24 NOVEMBER

The Chemical Society

Bristol: Chemistry Department, The University, 5.15 p.m. Joint meeting with the Student Chemical Society. 'Magnetism & the Shape of Inorganic Molecules' by Professor R. S. Nyholm, D.Sc., A.R.I.C.

Hull: Chemistry Department, The University, 6.30 p.m. Joint meeting with the Royal Institute of Chemistry. Lecture by Professor W. Bradley, M.Sc., Ph.D., F.R.I.C.

Incorporated Plant Engineers

Sheffield: Grand Hotel, 7.30 p.m. Discussion 'The Treatment of Effluents'.

The British Ceramic Society

London: Connaught Rooms, Holborn, WC2, 7 p.m. Annual Dinner & Dance.

The Chemical Society

Aberdeen: University Chemistry Department, Old Aberdeen, 7.45 p.m. 'Reactions of Radicals in Gaseous Systems' by Dr. E. W. R. Steacie, O.B.E., D.Sc., F.R.S.

FRIDAY 25 NOVEMBER

The Chemical Society

Newcastle-on-Tyne: Chemistry Building, King's College, 5.30 p.m. Bedson Club Lecture 'The Relations Between Theory & Experiment in Physical Chemistry' by Professor E. A. Guggenheim, M.A., Sc.D., F.R.S.

Nottingham: The University, 4.45 p.m. 'Recent Advances in the Physical Chemistry of Sulphur' by Professor G. Gee, Ph.D., A.R.I.C., F.R.S.

Southampton: University Chemical Society Department, 5 p.m. 'Melting & Crystal Structure' by Professor A. R. Ubbelohde, M.A., D.Sc., F.R.S.

RIC (London Section)

Cambridge: University Chemical Laboratory, 8.15 p.m. 'Science in the Service of

[continued on page 1128

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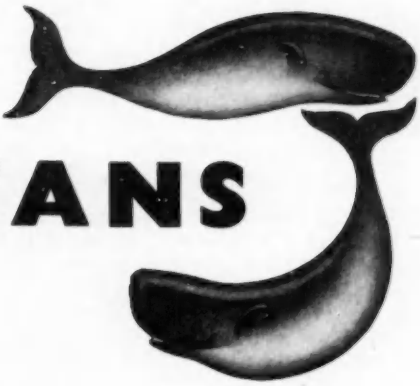

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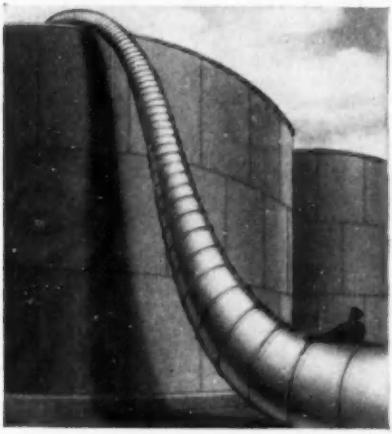

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Next Week's Events

continued from page 1126

Archaeology' by H. J. Plenderleith, M.C., Ph.D., R.R.S.E., F.S.A.

Society for Analytical Chemistry

Edgbaston: The University Chemistry Theatre, Birmingham, 15, 6 p.m. 'Modern Trends of Polarographic Analysis' by Professor J. Heyrovsky, Ph.D., D.Sc., of the Central Institute of Polarography, Prague.

Powered Chemical Transporter

A NEW-TYPE 20-foot container mounted on a Foden FG 6/15 8-wheel chassis for the bulk transportation of polythene resin has recently been put into service by ICI. By using Homalloy alloys, which are three times lighter than steel, in the structure of the container, the makers, Holmes Ltd. of Preston, have given the vehicle a 12-ton payload.

The container is double skinned to facilitate both internal and external cleaning, and the space between the walls can be used for inserting insulating material if required. Loading and unloading vents are positioned 45° at top front and rear bottom, and rapid discharge is effected by the positioning of baffle plates at the inside rear of the container to guide the material through the discharge opening.

Market Reports

LONDON.—Active trading conditions have been reported during the past week for nearly all sections of the market, and a good inquiry for shipment has been in circulation. Contract deliveries of the soda compounds and the potash chemicals have been maintained at recent levels, while formaldehyde, hydrogen peroxide, borax and boric acid are items for which there is a steady demand. Prices generally are firmly held. The coal-tar products continue firm with creosote oil, cresylic acid, pitch and crude tar in good request. There is also a good demand for the naphthalenes.

MANCHESTER.—Trading conditions on the Manchester market for heavy chemical products during the past week have been satisfactory in most sections. The alkalis and the potash and ammonia compounds are being taken up in good quantities under contracts and a fair number of additional inquiries from home users as well as from shippers have been circulating. Prices are firm pretty well throughout the range and seem likely to continue so. In the fertiliser section basic slag and the compounds are going steadily to the consuming end, but otherwise business is moderate. A steady demand for most of the by-products has again been reported.

GLASGOW.—On the whole, a good week's trading has to be reported from the Scottish heavy chemical market, which covered most sections of the industry both for prompt and contract deliveries. Prices have shown little or no change, with perhaps those applicable to metal salts firming. Agricultural chemicals have again been consistent with seasonal demands. The export market still remains steady.

Chemical Plant Food Factory

Work has begun on a $120,000 factory for manufacturing chemical plant food at Stratford, Ontario. United Co-operatives, who are building the factory, say it will be in production by March next year.

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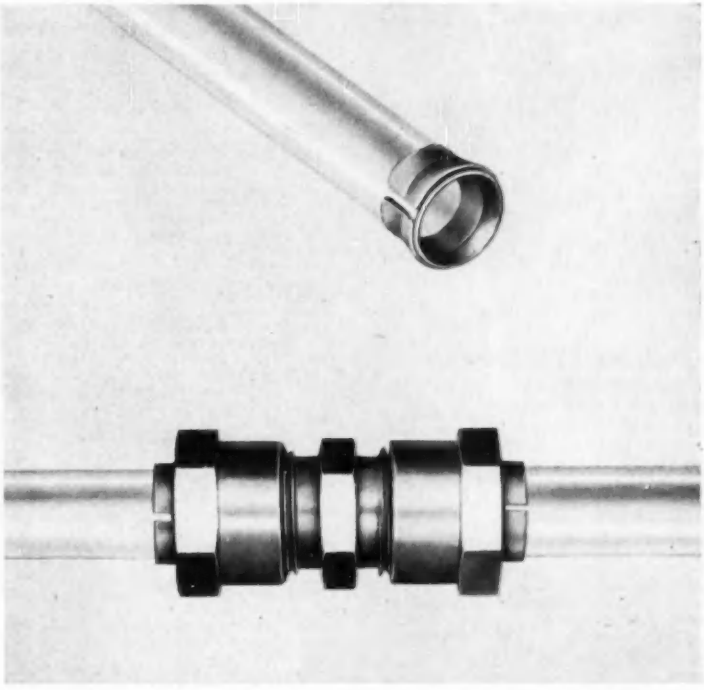

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SITUATIONS VACANT

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ASSISTANT PETROLEUM ENGINEER required by **KUWAIT OIL COMPANY** for service in **KUWAIT.** Applicants must possess a Degree in Petroleum, Chemical or Mechanical Engineering, Petroleum Technology, Geology, Physics, Chemistry or Mathematics. Some previous oilfield experience an advantage. Age 23-30. Salary starting not less than £790 per annum clear, plus generous allowances, Pension Scheme and kit allowance. Write for application form, giving brief details and quoting K.1819 and K.1913 to Box F/84, c/o 191, Gresham House, E.C.2.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH (INDIA)

Applications invited for post of

DIRECTOR,

CENTRAL SALT RESEARCH INSTITUTE,

BHAVNAGAR (SAURASHTRA), INDIA,

in scale £1,800 by £90—£2,250 per annum. Higher initial salary considered for exceptionally qualified candidate. Applicant must have a Doctorate in Physical or Inorganic Chemistry with wide experience mainly in industrial research, together with administrative experience and ability to co-ordinate research in various divisions dealing with salt and its by-products.

Appointments will be, in the first instance, for three to five years. Free first-class passage for appointee and wife. Supplementary information and forms of application from

HIGH COMMISSION OF INDIA,
ESTABLISHMENT DEPARTMENT,
ALDWYCH, LONDON, W.C.2,

quoting 4/95G.

Last date for receipt of application, December 31, 1955.

GRADUATES in **MECHANICAL** and **CHEMICAL ENGINEERING** required for progressive positions in the Research, Design and Production Divisions of **THE POWER-GAS CORPORATION LIMITED. Training given to men without previous industrial experience. Apply to:—STAFF PERSONNEL MANAGER, PARKFIELD WORKS, STOCKTON-ON-TEES.**

INDUSTRIAL CHEMIST required by leading container closure manufacturers in Midlands. Progressive position requiring knowledge metal printing, varnishing, stoving, and metallurgy, associated with food packaging industry. Maximum age 35 years.—Written applications, with details of experience previous appointments, etc., to **P. A. METAL CLOSURES LTD., BROMFORD LANE, WEST BROMWICH, STAFFS.**

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EXPERIMENTAL OFFICERS AND ASSISTANT EXPERIMENTAL OFFICERS
in various Government Departments.
The Civil Service Commissioners invite applications for pensionable posts.

The posts are divided between following main groups and subjects:—

(*a*) Mathematical and Physical Sciences;
(*b*) Chemistry and Metallurgy;
(*c*) Biological Sciences;
(*d*) Engineering subjects; and
(*e*) Miscellaneous (including, e.g., Geology, Library and Technical Information Services). There are at present no vacancies for meteorologists.

AGE LIMITS—For Experimental Officers, at least 26 and under 31 on December 31, 1955; for Assistant Experimental Officers, at least 18 and under 28 on December 31, 1955. Extension for regular service in H.M. Forces. Candidates aged 31 or over, with specialised experience, for Experimental Officer posts may be admitted.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University degree. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general, a higher standard of qualification will be looked for in the older candidates than in the younger ones.

SALARY (London):
Experimental Officer, £790-£960 (men); £693-£848 (women).
Assistant Experimental Officer, £320 (at age 18) to £700 (men), £614 (women). Starting pay up to £575 (men) or £537 (women) at 26. Somewhat lower outside London. Promotion prospects. Women's scales subject to improvement under equal pay scheme.

Further particulars from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting No. 894-95/55. Completed applications should be returned as soon as possible, and in any case not later than December 31, 1955.
8110/60/10/55/SD/b.

UNITED COKE AND CHEMICALS COMPANY, LTD., producers of organic chemicals from coal, require a **TECHNICAL ASSISTANT TO THE COMMERCIAL MANAGER.** His duties will include market research, advertising and technical liaison with research and works departments. He should have practical experience of sales or development or market survey work involving visits to outside firms on his own. Age preferred, 27-35. Honours Degree in Chemistry essential. Salary according to qualifications and experience. Pension Scheme. Reply, giving personal details and brief account of education, qualifications and experience, to the **COMMERCIAL MANAGER, 34, COLLEGIATE CRESCENT, SHEFFIELD, 10.**

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required by the
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To assist in the supervision of the work in an Industrial Chemistry Laboratory engaged on a variety of chemical services to the Establishment, including the testing of industrial wastes, control of chemical process, metallurgical and general chemical analysis, etc.. Minimum qualification is H.S.C. (Science) or equivalent, but a Degree or H.N.C. in Chemistry would be an advantage. Applicants should be at least 26 years of age and have had at least five years' experience in general chemical analysis. Some experience in chemical process control an advantage.

SALARY £808-£988 per annum (male).
Contributory Superannuation Scheme.

Married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively, assistance towards legal expenses incurred in house purchase will be available; until housed a lodging allowance may be payable.

Requests for application forms by **POSTCARD** to the SENIOR RECRUITMENT OFFICER at the above address.
Quote Reference A617/38.

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UNITED COKE AND CHEMICALS COMPANY, LTD., producers of organic chemicals from coal, require an experienced **CHEMICAL SALESMAN**, aged 27-35. Honours Degree essential, preferably in Chemistry. Special knowledge of plastics, paint or synthetic resin industries an advantage. Salary according to qualifications. Pension Scheme. Reply, giving personal details and summary of education, qualifications and experience, to the **COMMERCIAL MANAGER, 34, COLLEGIATE CRESCENT, SHEFFIELD, 10.**

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SALARY £1,155-£1,350 per annum (male).
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Successful married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively, assistance towards legal expenses incurred in house purchase will be payable.

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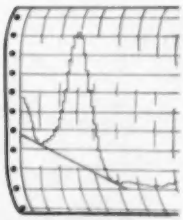

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We have long experience in designing solvent recovery plants and in manufacturing activated carbon of various grades suitable for different purposes. Plants supplied twenty-five years ago still maintain high efficiency with reliability and safety. ULTRASORB carbons are available for recovery of most industrial solvents, benzole extraction, water purification and other gas and liquid phase applications.

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TELEPHONE: WATERLOO 7744 CABLE: BRICARBUN SEDIST, LONDON

FANTASY – yes,
but is it so *fantastic?*

Interplanetary travel is quite feasible and (in the not too distant future) highly probable. The experts who are planning the next stage of man's greater achievements have carefully calculated all factors in men and machines.

Fuel is of course a major problem not yet solved, the answer to this may lie within the field of Fluorine Chemistry

At present Imperial Smelting Corporation make no claims for an interplanetary fuel, but remarkable advances have been made in other fields for industrial and domestic use.

Fluorine compounds are playing an ever increasing part in our daily lives and a brilliant future lies open for this highly specialised group of chemicals — in our Research Laboratories investigations are being conducted in an endeavour to make the greatest use of these chemicals.

ANHYDROUS HYDROFLUORIC ACID
HYDROFLUORIC ACID · BORON TRIFLUORIDE
BENZOTRIFLUORIDE · FLUOSULPHONIC ACID

The above compounds are of great value in the manufacture of fluorinated materials and are available in commercial quantities. Industrial applications include catalysts, lubricants, plastics and specialised welding.

Should you have any problems or theories on these or any other applications, please consult us.

IMPERIAL SMELTING
U.K. MEMBER OF THE CONSOLIDATED ZINC CORPORATION LIMITED

PIONEERS IN
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